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A MATTER OF POLICY

Since the appearance of our first issue in March, the letters to the editor (see that section) have reflected a justifiable uncertainty as to the exact jurisdiction which our publication would claim. A glance at the letters shows that we have been hailed by some as a new journal of musicology in the English language, for which there seems to be more desire than we would have imagined. On the other hand, there are composers who express the fear that a preoccupation with historical theory may lead us away from the problems of contemporary theory and its application to contemporary composition. They do not want the scholarly aspects of music theory to overbalance the practical in our publication.

Naturally, these matters were the principal area of discussion when our periodical was founded. It was the feeling of the board that such magazines as The Musical Quarterly, Score, and the ACA Bulletin devoted ample space to the general stylistic description of contemporary styles of composition. We would concern ourselves with problems of theory first, with their application to composition only secondarily. It was therefore made a matter of editorial policy that we would not consider for publication, nor include in our bibliographies, articles which were stylistic descriptions of the works of any single composer, particularly since such articles rarely include the formulation of any specific theoretical principles. On the other hand, we would consider for publication, and list in our bibliographies, articles which developed a theoretical principle and then illustrated it, even if the illustrations involved the works of only a single composer. This editorial policy was to be applied indiscriminately to all periods of history.

When we formed our policy, published our first issue, and wrote our first foreword, we were not aware how disastrously accurate our observation that "theoretical discovery has languished" would prove to be. To date, with three exceptions, article material which has been submitted to us has been written by musicologists, not theorists or composers. This parallels another unexpected development; approximately two-thirds of our circulation is comprised of musicologists, not theorists or composers. We firmly believe that this is largely due to the fact that theorists, in particular, have found little encouragement to express themselves creatively in their vocation. Composers, on the other hand, labor under the risk that any extensive theoretical endeavour may damn them as pedants in the eyes of their critics. It is only the musicologist, apparently, who is accustomed to reflect seriously on the world of music and who is encouraged to write down his reflections in some finished form.

For these reasons, then—the historical bent of both our present subscription list and our present contributors—we may be forced to emphasize the historical aspect of our subject. We wish to assure contemporary theorists and composers, however, that this does not mean that they have been forgotten. We came into being in the hope of encouraging them. At the earliest opportunity we hope to achieve a proper balance between the historical and the contemporary in our publication. This, however, can only be accomplished if those who wish it both subscribe to and contribute to our endeavour.

We are most anxious to publish lucidly written accounts of contemporary theoretical thought and practice, as well as original concepts of theory pedagogy. We firmly believe that there are theorists, composers, and theory teachers throughout the country possessed of considerable originality. That they have not written down their ideas to date is understandable since there was little or no likelihood of publication. We stand ready to offer that opportunity. If an idea is so concise as not to warrant a complete article, it will find its proper place in the "Forum" which we are initiating with this issue. As we said in our previous foreword: "Here is the stage." Unfortunately, we find ourselves still awaiting with anticipation the entrance of those that we hoped most would make use of it.

DK

HARMONIC THEORY IN ENGLAND AFTER THE TIME OF RAMEAU

by

Erwin R. Jacobi[1]

In the year that Rameau died, a man travelled from England to Paris whose personality and work were to have a decisive influence on the attitude of the English musical world toward developments on the European continent for decades to come: Charles Burney[2]. Even though

1. This article is a translation from the German of the first chapter of a doctoral dissertation presented at the University of Zürich, Switzerland, the full title of which is The Development of Music Theory in England after the time of Jean-Philippe Rameau. The preface, introduction and first chapter of the dissertation, together with the complete table of contents and bibliography of sources, appeared earlier this year in German as Volume 35 of the Sammlung Musikwissenschaftlicher Abhandlungen, P. H. Heitz, Strasbourg. This first chapter of the dissertation is concerned with the developments in England from the time of Rameau's death in 1764 to the publication in 1845 of the most influential and all-embracing theory of harmony to come from nineteenth-century England, that of Alfred Day.

The translation is by David Kraehenbuehl. Those who compare this translation with any of the published versions in the original language will discover that all the direct quotations from the English treatises cited have been paraphrased in the German versions of the article. The author and editor felt that these would be most useful to English readers if they were presented in their exact wording. Readers who are unfamiliar with the technical terms of harmonic theory that appear in treatises of the time will find thorough explanations of these in Matthew Shirlaw's The Theory of Harmony, reprinted in 1955 in Dekalb, Illinois by Birchard Coar. The section of this article concerned with the work of Kollmann was published separately in German in the Archiv für Musikwissenschaft, Vol. XIII, Nr. 3/4, 1956, pp. 263-270.

2. Charles Burney (1726-1814) has gone down in history as a leading music historian on the basis of his A General History of Music (the first in the English language) which appeared in four substantial volumes in the years 1776 to 1789. With the exception of John Hawkins' historical work (cf. page 130), which appeared a few months later than Burney's first volume in 1776, it was almost 125 years before another work of equal stature and scope appeared in the English language in the form of the Oxford History of Music. In 1770, Burney began his journeys to France, Italy, Holland, Germany and Austria in order to gather authentic materials on the spot for his planned historical work; smaller publications appeared already in 1771 (on France and Italy) and in 1773 (on Germany and Holland). Burney married a sister of the English poet, William Cowper (also written Cooper); he knew how to work himself up into an almost unexampled position of influence socially and how to

Burney was no music theorist (as we shall see, some of his statements in this area demonstrate a considerable superficiality), he deserves prominent mention here because his comments on Rameau undoubtedly made a lasting impression in England. In the fourth volume of his great history of music, five and one-half pages (p. 612 ff.) are devoted to Rameau's theories:

"After frequent perusals and consultations of Rameau's theoretical works, and a long acquaintance with the writings of his learned commentator D'Alembert, and panegyrists, the Abbé Roussier, M. de la Borde[3], etc. if any one were to ask me to point out what was the discovery or invention upon which his system was founded, I should find it a difficult task.

"The base to a common chord has been known ever since the first attempts at counterpoint; and it only seems as if Rameau had given new names to old and well-known combinations, when he calls the keynote, with $\frac{5}{3}$, Generateur, Basse-fondamentale. But the Italians, ever since the time of Zarlino, have distinguished this lowest sound by calling it the first base, 1mo. basso; and the other parts of the chord when made the base, basso rivoltato, or 2do. basso. But Brossard in his Musical Dictionary, published 1702, in defining Trias harmonica, or the three sounds of a common chord in its first state, calls the under-note basse, or son fondamental; and afterwards remarks that among the three sounds that compose the Triade harmonique, the gravest is called basis, or sonus fundamentalis. And what has Rameau told us more, except that that the harmoniques produced by a string or pipe, which he does not pretend to have first discovered, are precisely the third and fifth in question. This is the practical principle of the fundamental base; the theoretic was surely known, of harmonical, arithmetical, and geometrical proportions and ratios of sound, with which so many books have been ostentatiously filled ever since the time of Boethius.

"The Abbé Roussier, his most learned apostle and able champion, candidly confessed in his first work, that 'the system of a fundamental base ought not to be regarded as one of those principles which precedes the consequences to be deduced from it. Le mérite du cette decouverte consiste, à avoir réduit en un système simple, commode, et facile à saisir, toutes les opérations des grands maîtres de l'harmonie.' Traité des Accords, 1764."

Burney continues:

"Rameau's system, as compressed and arranged by D'Alembert (Elemens de Mus. Theor. et Prat. suivans les Principes de Rameau,

make his house a center for the highest circles not only in the arts, but in the political and scientific worlds as well; Joseph Haydn visited Burney first after his arrival in England, and personal friendships bound him to George III, Queen Charlotte, Burke, Pitt, Johnson, Boswell, and numerous other leading personalities.

3. Jean-Benjamin de la Borde, as well as Abbé Roussier, were pupils of Rameau.

. 1752 and 1762—footnote by Burney) is perhaps the shortest, clearest, and best digested, that is extant; and yet, from the geometric precision with which it has been drawn up by that able mathematician, many explanatory notes and examples are wanting to render Rameau's doctrine intelligible to musical students in the first stages of their application; and even after that, the work, to be rendered a complete theory, would require many additions of late discoveries and improvements, both in the theory and practice of harmony. (Many opinions concerning melody, taste, and even harmony, which were current forty or fifty years ago, would now only excite contempt and laughter. Imagination, which had been manacled by narrow rules, formed on Gothic productions, at length broke loose and liberated, flutters and flies about from flower to flower, sipping like the bee its native food wherever it can be found. —footnote by Burney)

"About the year 1760, the System of a Fundamental Base, by Rameau, gave occasion to much discussion in Germany. By some it was adopted there as well as in Italy, by others disputed. It seems, however, as if this system, ingenious as it is, were somewhat overrated by French theorists, who would persuade the world that all Music not composed on Rameau's principles should be thrown into the flames—Jusqu'à mon systeme says Rameau himself; and M. de la Borde says, that 'Music since the revival of the arts was abandoned to the ear, caprice, and conjecture of composers, and was equally in want of unerring rules in theory and practice—Rameau appeared, and chaos was no more. He was at once Descartes and Newton, having been of as much use to Music as both those great men to philosophy.' But were Corelli, Geminiani, Handel, Bach, the Scarlattis, Leo, Caldara, Durante, Jomelli, Perez, etc. such incorrect harmonists as to merit annihilation because they never heard of Rameau or his system? Indeed, it may be further asked, what good Music has been composed, even in France, in consequence of Rameau giving a new name to the base of a common chord, or chord of the seventh? The Italians still call the lowest sound of Music in parts the base, whether fundamental or derivative; but do the French imagine that the great composers abovementioned, and the little composers who need not be mentioned, were ignorant whence every supposed base was derived? The great harmonists of the sixteenth century seldom used any other than fundamental bases. And the fundamental base to the hexachords has always been the keynote, and the fifth above and fifth below, just as Rameau has given it in his theoretic tracts.

"But though the several merits of this musician have been too much magnified by partizans and patriots in France, and too much depreciated by the abettors of other systems and other styles, as well as patriots of other countries, yet Rameau was a great man; nor can the professor of any art or science mount to the summit of fame; and be elected by his countrymen supreme dictator in his particular faculty, without a large portion of genius and abilities."

So much for Burney on Rameau; there is not space here to undertake a critique of Burney; on the other hand, a few observations will help us to understand certain English attitudes of the time:

In eighteenth-century England, Italian influence was much stronger than French, both in public musical life and in the selection of teachers for England's youth. English theorists, as for example Charles Avison[4], went to Italy for the most part to study. Italian opera held a commanding position in England; men like Geminiani[5], the Castrucci brothers[6], and Bononcini[7] lived, worked, and wrote in England; nor can we overlook Handel's efforts to draw Italian personalities to England.

An opposition between the Italian and French styles in music can be demonstrated almost throughout history (already even in the periods of early polyphony; nor is it uninteresting, for example, to compare the style of harpsichord composing developed by Domenico Scarlatti in the eighteenth century with that of François Couperin, among others). It was impossible that Italian and French influences should exist at the same time and to the same degree in English music. For example, John Hawkins (see below) writes in 1776 in his music history: "as to the French music in general, the merit of it has at different periods been a subject of controversy; many think that in the art of musical composition the French are an age behind the rest of Europe: and many more are of the opinion that, having deviated from the path of nature, they may be two before they find their way back again."

It must further be remembered that the French revolution aroused comparatively little sympathy in England (the English

4. Charles Avison (1710-1770), a very popular organist and music scholar of his time, was recalled from virtual oblivion to a large public through Robert Browning's poem, "With Charles Avison," which appeared in his late work of 1887, Parlayings with Certain People of Importance in their Day. He studied first in Italy, later with Geminiani in England, published a book, An Essay on Musical Expression, in 1752, which received wide distribution and was translated into German in 1775 under the title, Versuch über den musikalischen Ausdruck. Therein Avison praises Marcello and Geminiani above all. The little book is worthily and ingeniously written but deals exclusively with aesthetic and general considerations.

5. Francesco Geminiani (1687-1762), violinist and composer, a pupil of Corelli, went to England in 1714 where he published, among other more elementary didactic works, his famous instruction book for the violin, The Art of Playing on the Violin, which appeared a few years ago in a facsimile edition by the Oxford University Press, London.

6. Pietro Castrucci (born 1679), likewise a pupil of Corelli, went to England in 1715 in the company of Lord Burlington, a genteel lover of music. He was concertmaster of the Handel opera orchestra for many years. His brother, Prospero, likewise a violinist, came to England later.

7. Giovanni Bononcini (1670-1755), an Italian composer (primarily of opera), came to London in 1720 in connection with the great rise of Italian opera in England at that time.

"Glorious Revolution" of 1689, exactly one hundred years earlier, was, considering the English temperament, conducted in a considerably milder fashion!); a single statesman, Edmund Burke[8], succeeded in prejudicing the overwhelming majority of the English people in every class against the ideology of the French revolution with his own views regarding state government as presented in his Reflections on the French Revolution published in 1790, as well as his political actions while prime minister of England.

In the same year, but shortly after the appearance of the first volume of Burney's history, another history appeared in the English language: John Hawkins, A General History of the Science and Practice of Music (1776; new edition: London, 1853). Hawkins, long regarded as a rival of Burney, contented himself largely with the establishment and presentation of facts, with little personal commentary. With regard to Rameau, he writes (1853 edition, page 900 ff.):

"But the work for which Rameau is most celebrated is his 'Démonstration du Princips de l'Harmonie', Paris 1750, in which, as his countrymen say, he has shewn that the whole depends upon one single and clear principle, viz., the fundamental bass: and in this respect he is by them compared to Newton, who by the single principle of gravitation was able to assign reasons for some of the most remarkable phenomena in physics; for this reason they scruple not to style Rameau the Newton of Harmony ... As a theorist, the character of Rameau stands very high; and as a testimony to his merit in this particular, it is here mentioned as a fact, that Mr. Handel was ever used to speak of him in terms of great respect."

It should be pointed out here that, during Rameau's lifetime, the third part of his Traité de l'Harmonie, reduite à ses Principes naturels (Paris, 1722, Livre III, "Principes de Composition") was translated into English (appearing in London in 1737 under the title "A treatise of Musick, containing the Principles of Composition, wherein the several parts thereof are fully explained and made useful both to the professors and students of that science," second edition, 1752). Towards the end of the eighteenth century an English translation of the fourth part of the Traité ("Principes d'Accompagnement") was published in London (under the title "A Treatise on Harmony, in which the Principles of Accompaniment are fully explained and illustrated by a variety of Examples"). Around the turn of the century an English translation of Catel's instruction book, renowned in France, appeared under the title "A Treatise on Harmony, Written and Composed for the use of the Pupils of the Royal Conservatoire of Music in Paris."

In order to establish what portions of Alfred Day's system of theory were taken over from earlier works, what were revisions of earlier works, and what were original contributions by Day, it is necessary to know what theories existed in England prior to the publication

8. One of the greatest English statesmen and political writers, 1709-1797.

of his system in 1845.[9] The reader will learn nothing concerning these questions from Day himself or from his disciples, opponents, or critics; only repeated and similar expressions are discovered to the effect that, prior to the publication of his work, there existed in music theory only a chaos of countless rules and exceptions to rules without any system at all.

Of the innumerable, often remarkably penetrating, complete, and clear publications whose titles indicate that they are basic tracts in the realm of harmonic theory, only those will be considered here that have significance for the development of English theory during this time. The remainder (for example, by Benjamin Stillingfleet[10], John C. Heck[11], Dr. J. W. Callcott[12], William Shield[13]) are either more or less worthy instruction books for practical purposes (primarily for the playing of thoroughbass) or philosophical and aesthetic discussions that have little or nothing to do with theory in the sense that we are using the term here, i. e., as the scientific aspect of musical composition which orders the work-materials of the composer, primarily melody, harmony, and rhythm. (The word "theory" is often used erroneously in the sense of rules for harmony and counterpoint; consequently a manual or a primer with exercises according to those rules is often erroneously called a "theory book.") Although the period from 1770 to 1845 was one of earnest theoretical endeavor, its writers were not granted the opportunity, in the long run, to found any national school or tendency. Furthermore, the English theorists of this period were heavily influenced for the most part by continental theorists, which they often admitted openly. As in all times and in all lands, also in this period there are only a very few treatises which endeavor to attack, in any way whatsoever, the basic questions of the nature and derivation of musical materials.

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9. It may be assumed, of course, that a person like Alfred Day, who had studied in France and Germany, knew the most important theoretical works of the eighteenth and early nineteenth centuries from those countries in the original.

10. Regarding Stillingfleet and his analysis of Tartini's Trattato, see footnote 29.

11. John C. Heck, a musician born in Germany in 1740, put out in London, among others, a book entitled A Complete System of Harmony (1768) which in no way deserves such a title.

12. Dr. John W. Callcott (1766-1821), a well-known organist and composer of his time, published in 1806 A Musical Grammar, a truly excellent and useful grammar of music for the practical musician which appeared in its eleventh edition in 1825 and was still being reprinted in 1883. This book is important because of its comprehensive references to literature and its accomplished correlation of the most various aspects of notation, melody, harmony, and rhythm.

13. Regarding Shield, see footnote 31.

William Jones[14] (also called "Jones of Nayland") published A Treatise on the Art of Music in 1784 with the subtitle: "in which the Elements of Harmony and Air are practically considered and illustrated by an hundred and fifty examples in Notes, many of them taken from the best Authors; the whole being intended as a Course of Lectures, preparatory to the practice of Thorough-Bass and Musical Composition and dedicated to the Right Honourable, etc., the Directors of the Concerts of Antient Music." Among the subscribers to this book we find such prominent names as the Earl of Exeter, Lord Viscount Fitzwilliam, and Walter Scott of Arden, Esq.[15] As would be expected from Jones's position as a prelate of the English church and as the dedication of his book demonstrates, he is a staunchly conservative personality; for him, "the Golden Age of Music is past." In England, it extended from Byrd, Tallis, Gibbons, past Purcell and Croft, to Handel; then Corelli, Geminiani, and Pepusch are given some recognition. From Jones's standpoint, the development of an independent instrumental music bears with it the danger that sound without meaning will predominate. He therefore proposes to organize his method after the examples of the masters rather than after some preconceived theories. He praises Burney for his vindication of the old church composers and his commentary on Josquin; and, further, Marpurg, whose writings had just appeared in an abridged English translation as Jones finished his work. He cites with pride "an old Italian professor in Oxford" and describes himself as always for the old style: "I confess very freely that my feelings give their testimony to the Style which is now called ancient," and speaks frequently of an existing rivalry: "we are now divided into parties for the old and the new Music."

Jones "considered the Theory of Musical Sounds as a branch of Natural Philosophy"; philosophical and aesthetic viewpoints carry much weight in his book. His many-sided education and extensive reading make whole chapters of his book interesting and still worth reading in their entirety today. He cites Rameau immediately in his introduction:

"The System of fundamental Basses, I am told is the property of Rameau: and I believe Rameau had great merit in extending and applying it: but there seems to be no occasion to go to any modern for the

14. William Jones of Nayland (1726-1800), a clergyman in the English church, achieved in his time a considerable reputation as such. As a theologian he had strong tendencies toward the followers of John Hutchinson (1674-1737), who had written a natural philosophy and had taught a mystical interpretation of the Bible that attacked Newtonian philosophy (according to Hutchinson, the Bible contained not only the elements of a true religion but also the basis for a rational philosophy). Jones studied at Oxford, occupying himself throughout his life with music and natural philosophy, as well as theology, publishing numerous works in all three areas. A complete edition of his works appeared in twelve volumes in 1801; a later one, 1810, in six volumes. The tract named above appeared in a second edition in 1827. Jones, who received his second name from the locality of Nayland in Suffolk where he lived for many years, published a few smaller treatises concerning musical philosophy and aesthetics, also a number of compositions.

15. Probably the father of the famous author.

principle itself, which regulated the antient Scale of Guido Aretinus, whose three Hexachords of the Gamut are accommodated to the three keys which constitute the fundamental Harmony of the Octave of the natural key of C,..."

Regarding the purpose of his book, Jones says first that he wished to write a consistent system of principles for thoroughbass and rules for modulation for a lady who was an exceptional harpsichord player; then, changing his purpose entirely, for a few young friends "who wished to know the reason of things, and to learn Music as Scholars learn other things, by learning the Principles of the Art in the first place; which in this art is contrary to the general practice." He wishes, however, to make no investigation of the theoretical premises of music since few readers would understand them and they have neither interest nor significance for the practical musician. As Geminiani, Pasquali[16], C.P.E. Bach, and Bemetzrieder[17], had already written on performance practice, he would begin with the first basic principles.

With regard to chromatic harmony, he observes in his introduction that it "is a Proteus capable of so many forms, that it is very hard to reduce it to a proper degree of simplicity... but there would be no end if a writer on Music were to follow his subject as far as it would lead him."

The whole work[18] is divided into nine chapters: "of the Scale of Music..., of Concords, of the Octave as a System of Harmony, of the Inversion of Chords..., of the Harmonic Derivation and use of Discords, of Modulation..., of Harmonic Periods..., of the Chromatic System, on the Analysis of Air..., on the Application of all the foregoing Rules." Worthy of note is the following observation of the author regarding his book: "my rules are rather extracted from Musical Compositions than from Musical Treatises, especially in the eighth Chapter [i.e., on the analysis of air] which is the longest, and the most critical of all..."

Jones gives no theoretical derivation for the scales, but cites only the Greek tetrachords, Guido's hexachord system, and the tonal divisions of the octave as the current system of tonal steps, "those just Degrees and Distances of Sounds, which produce Harmony and are agreeable to the Ear, are comprehended within a certain System, the philosophical Reasons of which are not necessary to a practical Musician: it being only required of him to know what they are, and how to apply them according to the rules of art." He recommends Morley for

16. Niccolo Pasquali (died 1757 in Edinburgh), like Geminiani, came to England as an Italian violinist and composer around the middle of the century (1743), settling in Scotland where he published among other works a thoroughbass instruction.

17. Anton Bemetzrieder (1743-1817), an Alsatian writer on music and pedagogue, came to England in the second half of the century (1781) where he published, among other items, an English translation of his instruction book on harpsichord playing and harmony.

18. The book, consisting of 12 pages of introduction, 61 pages of text, and 40 pages of musical examples, is printed in quarto.

the study of monodic songs. His definition of consonance is primarily aesthetic in nature. "And the Bass which is the radical Base of the Chord is distinguished from figurative or artificial Basses as the Fundamental."

It is observed in the chapter "of the Octave as a System of Harmony" that "these three Keys [C, G, and F in the scale of C] comprehend all the native harmony of the Octave; and the three notes C, G, F are the fundamental Notes, because they carry all the degrees of the Octave in their Accompaniments. The fundamental Harmony of a key... teaches the art of keeping the key." Also here Jones makes an acknowledgement to Rameau of whom he adds, however, "though I think his work scarcely intelligible to Learners, and very badly arranged." (At all times we find this practical viewpoint stressed by the English music theorists more than on the continent—consideration for the reader in general and particularly for the student in the organization of books as well as in the introductory remarks. This circumstance should by no means be taken to indicate that there were fewer "scientifically" oriented or educated theorists among the English; it appears more to be the result of a kind of practical notion of education that is peculiar to the English national character; and finally, the English people had their revolution and parliamentary reform behind them, had already accomplished a more democratic way of life, while the culturally leading countries of the continent were still standing entirely under absolutist governments.) Therefore, while Jones declines to accept Rameau from the standpoint of method, he recommends strongly and repeatedly Dr. Pepusch's A Short Treatise on Harmony (published in 1730)[19].

After Jones has demonstrated, in the same chapter, how the ascending and descending major scale can be harmonized without modulating, using only the acceptable scale tones from the basic harmonies of the tonic, dominant, and subdominant, he explains in closing: "I do not add an Example of the Minor Key in this place, because the case is not so simple, as the degrees of the Minor Key do not furnish an harmonic accompaniment to the Notes of the Octave when taken as Basses, even in descending, and much less in ascending: so I reserve this till we come to the Doctrine of Modulation."

"Basses by supposition" (e. g., the tone G for a diminished triad on the tone B in the C-major scale) are contrasted with "fundamental Basses"[20]; as an analogous situation, the church modes are cited,

19. Dr. John Christopher Pepusch (1667-1752), born in Berlin, came to England about 1700 where he won recognition as a composer. Indeed, John Hawkins, in his music history, already placed Dr. Pepusch, almost forgotten today as a theorist, on a level with Zarlino: "those deep theorists, Zarlino and Pepusch."(!)

20. The concept of the "fundamental harmony," with whose help here in the diatonic system of the octave the original key is kept together, appears later in Day with a completely different meaning, namely as a concentration of the chromatic harmonies opposed to the diatonic. The concepts "fundamental" and "essential," specifying particular tones, intervals, chords, and harmonic systems, were used altogether inconsistently by the most various European theorists of the

where each step of the octave, with the exception of the major seventh, indicated a specific mode.

In dealing with the inversion of chords and their "internal consonance" it is observed: "if the Notes of which a Chord consists be taken severally from above, and put below as Basses, the harmony will be changed. This is called the Inversion of a Chord, to produce new relations and great variety arises in Music upon this principle." As he indicates, Jones directs his exposition here more to the thoroughbass player than to the composer. Of particular significance to him are various arrangements of the chord tones (above an identical bass tone), through which, according to him, the degree of "internal consonance" can be noticably varied. From this observation he demonstrates also the admissibility of certain dissonances.

In order of importance, according to Jones, "the first and most agreeable of the discords" is the fourth taken together with the fifth and octave above the bass ($\frac{5}{4}$); next comes the ninth, as dominant of the dominant; and only third in his arrangement do we find the minor seventh, "commonly accounted the chief" discord, but which "is inferior on several considerations." Here again the abovementioned principle of "internal consonance" plays a role; and, further, the various possibilities for resolution are important in the designation and classification of dissonances. Of particular interest is Jones's basis for ordering individual dissonant chords: it is the sum of the consonant intervals in the chord compared with the sum of the dissonant intervals in the chord, the resulting relationship being in this case synonymous with the "internal consonance" (e.g., the chord G-B-D-F consists of four consonant and two dissonant intervals); and, on the basis of this relationship, certain dissonant chords are more bearable to the ear than others. In establishing the derivation of the fundamental bass from certain dissonant chords, Jones proceeds exactly as Rameau, whom he also cites in this case.

In the chapter "of Modulation, its Forms and Limits," the minor scale is explained as a kind of modulation of the major scale with no attempt being made to derive it theoretically. (In support of this, examples are introduced from Gibbons, Tartini, Corelli, and "from a Movement of Geminiani universally admired.")

Jones understands "Harmonic Periods" to mean sequences, for the study of which he again recommends Morley in particular, and then cites also certain passages from Pergolesi's Stabat Mater and from Carissimi. The "Chromatic System" has its sources, according to Jones, in the minor scale and in the variable nature of the sixth and seventh, as well as the third.

In the chapter "on the Analysis of Air, and the Conduct of Subject," Jones demonstrates his brilliant powers of observation and his capacity, schooled by broad studies, to recognize interdiscipline re-

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eighteenth and nineteenth centuries; it is necessary in every case to consider the context and the definitions.

lationships; the chapter remains however largely logical, philosophical, and aesthetic in nature, and we find only the barest beginnings for a technically useful system (but that is already a great deal in an area that had been almost completely neglected by theorists during the supremacy of the dominant-seventh chord in Europe). Jones refers back to that time when poetry and music were one and compares those aspects of rhetoric that may be learned with similar aspects of melody. "Harmony is enlivened by Air, and Air is supported by Harmony. But as Air is the production of the fancy or imagination, some have falsly supposed that it may be left, like the Nightingale, to the wildness of Nature; and that all rules can only serve to fetter and restrain it... yet there is no Science, nor any one part of a Science, in which Nature will not derive much assistance from Art and Experience... I am very sensible... that the attempt to reconcile Air with Reason, will appear like that of giving Laws to the Wind..."; ornamentation is also considered in this chapter devoted to the analysis of melody.

The section where Jones takes up the "meter-rhythm" problem is equally inspired. "But besides this Measure, which is as obvious as the measure of long and short Syllables, there is another Measure of Clauses, Sentences, and Paragraphs, by which the Air of a piece is to be regulated, and without which it is immethodical, and consequently obscure and without effect. This Measure is as different from the Measure of Time and Quantity, as Sense and Syntax are from Metre." Minuets, gigues, and gavottes arouse the most pleasure in the untrained listener (because of their regular meter), while "the Fugue, which is the most learned species of Music, strikes the memory and judgment with its proportion and symmetry, while it amuses the fancy with Air, and fills the Ear with harmony." ("Haydn and Boccherini merit a first place among the Moderns for invention.")

In the last chapter the author sums up briefly once again the purpose of his book: to bring the music student closer to the principles and rules of the various areas of music in order to make it possible for him "to acquire a learned Taste"; to this end, Jones assembles in closing all of his previous observations in the form of a set of rules for practical composition.

Since England and Germany were closely bound together by the relationship between the English royal family and the reigning line in Hanover, many German musicians left their homeland and went to England. Among these was Augustus Frederic Christopher Kollmann[21].

21. Augustus Frederic Christopher Kollmann (born 1756 in Engelbostel, Hanover; died 1829 in London), organist, theorist, and composer, was above all active as a teacher. He was called to London in 1784 as teacher and sexton for the German colony where, in 1792, he obtained the post of organist in His Majesty's German Chapel at St. James. It is this same Kollmann of whom Albert Schweitzer erroneously states in his book on J. S. Bach that he was an Englishman who prepared in 1799 the first edition of the WTC and in 1812 published an analysis of Bach's Preludes and Fugues (see Chapter XII, footnote 57, Chapter XV, the section on the WTC, and footnote 27 of the same chapter). It is true that Kollmann had announced his intention, in the first

In 1796 he published his first theoretical work on harmony: "An Essay on Musical Harmony, according to the Nature of that Science and the

edition of his Essay on Practical Musical Composition in 1799, to publish the WTC for the first time, but he never came to any realization of this plan. In the second edition of the aforementioned work on composition, appearing in 1812, Kollmann writes (Chapter 11, "Of Instrumental Music," section 21, page 62): "In the first edition of the present Essay, I announced an analyzed edition of his [J. S. Bach's] forty-eight Preludes and Fugues, entitled the Well Tempered Clavier, which had never been printed before. But as three editions of it were taken in hand soon after, viz. at Zurich, Bonn, and Leipzig, and numerous copies of them imported into this country, I relinquished the intended edition and attempted my Twelve Analyzed Fugues, which I have lately published." (This last refers to Kollmann's own compositions.)

Besides numerous examples from various works of J. S. Bach and other composers, Kollmann printed from the WTC only the Prelude and Fuge in C major (Book I) in his composition manual (1799) and, in the second edition (1812), the Prelude and Fugue in C major (Book II).

In the first number (only two numbers appeared altogether) of a trade paper, The quarterly musical Register, of which Kollmann was editor, he published merely a note on J. S. Bach and his works, in no sense "An Analysis of S. Bachs Preludes and Fugues," as W. Schmieder still writes erroneously on page 510 in the section on literature in his Thematisch-systematisches Verzeichnis der Werke Johann Sebastian Bachs, Leipzig, 1950. Kollmann himself gives us information about this in the same place cited above: "The greatest Composer for keyed instruments, as well as the greatest Performer on them ever known, has been John Sebastian Bach, some of whose works have been quoted in the preceeding part of this Essay; and an account of him maybe found in the Musical Register, No. 1."

Schweitzer takes his erroneous statements regarding Kollmann from Hermann Kretzschmar's closing commentary to the old Bach Gesellschaft Edition (Volume 46, Leipzig, 1896, "Bericht und Verzeichnisse," page xxiv) which he expressly quotes. In this place, Kretzschmar deals with the English Bach-movement of the late eighteenth century and speaks indeed of the "important" Kollmann edition of the WTC from 1799!

It is possible that Kretzschmar, for his part, was under the influence of Ernst Ludwig Gerber's Neues historisch-biographisches Lexikon der Tonkunstler (1813), in the third part of which (page 91 ff.) is actually written that Kollmann had edited at London, in engraved form, Johann Sebastian Bach's WTC with explanatory remarks! In the same place, Gerber writes regarding Kollmann: "This active man took it upon himself to acquaint the English, through his pen, with what German industry and German art had accomplished in music. This was carried out especially in his Essay on Practical Musical Composition. In addition, he belongs among the prolific composers. And if his practical works seem of lesser import to German ears, accustomed to the works of Haydn, Mozart, and others; they gained without doubt their full merit among the English."(1)

Principles of the Greatest Musical Authors"[22], dedicated to his friend, Burney; in 1779 there followed An Essay on Practical Musical Composition, shortly thereafter, A Practical Guide to Thorough-Bass, and, in 1806, "A New Theory of Musical Harmony, according to a complete and natural system of that science," dedicated to the President and Congress of the Royal Society[23]. All of these theoretical and technical works were brought out in more than a single edition, and Kollmann occupied a central position in the musical life of London, particularly as a teacher in the German colony there. In his first work on harmony, he follows principally Johann Philipp Kirnberger, whose system he claims with pride to have introduced to England.[24] He holds it to be the best of the theoretical works known up to that time. Nevertheless, over a period of ten years following this publication, he discovered that this system was still not complete and he undertook to correct these deficiencies. The result of these efforts was his book, A New Theory, as he writes in the preface of this work.[25]

22. Eighteen pages of introduction, 128 pages of text, and 40 pages of musical examples, in quarto.

23. Eighty-four pages of text and 36 pages of musical examples.

24. Cf. the two principal works of Kirnberger: 1) Die wahren Grundsätze zum Gebrauch der Harmonie (1773), and 2) Die Kunst des reinen Satzes in der Musik (1774-1779). Kirnberger declares himself primarily against Rameau and still more against his prophet, Marpurg. He recognizes only the triad and the seventh chord, to be sure on every step of the diatonic scale, as the starting point for a complete harmony.

25. For the sake of completeness we must mention here the somewhat superficial comment on Kollmann's theoretical works in the Biographie universelle des Musiciens (second edition, 1866) of François Joseph Fétis: according to this, Kollmann wishes, in his first work, to amalgamate two contradictory theories, namely those of Kirnberger and Marpurg, and therefore could not realize any unified approach; Kollmann became aware of this himself in later years after he came to know the system of Ballière who had constructed, in 1764, a music theory based on the tones of the hunting horn, respectively those of the trumpet (Théorie de la Musique); Jamard (who is actually mentioned by Kollmann), in his own theoretical work in 1769 (Recherches sur la théorie de la musique), developed the ideas of Balliere and established a complete series of hunting horn tones instead of the diatonic scale, usual until then, in which he replaced the geometric ratios in the calculation of intervals of Ballière's reckoning with arithmetic ones which also proved to be wrong. (Kollmann refers to the indicated work of Jamard in a single place, and that only in his first theoretical work which appeared in 1796—in his second chapter on intervals, the fourth part concerning consonances and dissonances, page 11 ff., in conjunction with his description of the natural intervals 4:7 and 7:8.) This reference is of interest primarily because, seen through Fétis' eyes, it demonstrates an alleged error which can come about through a search for some "naturalistic" bases for music.

This comment of Fétis is taken up and reiterated similarly by Lucien Chevaillier in his voluminous chapter on "Les Théories Harmoniques" in the Encyclopédie de la Musique (Alb. Lavignac—L. de la Laurencie), part 2, the volume entitled "Technique—Esthétique—

Kollmann begins the introduction of his first book with these words: "The science of music may be brought under two general heads, viz.: that, of just harmony, and that, of practical composition." He shows parallels to both in the field of language. He begins immediately with the scales, takes up thoroughly the problems of various tunings (where he demonstrates a noticable preference for the Kirnberger system of unequal temperament), harmonic and melodic intervals, and then, in several chapters, the various types of chords. "All musical harmony arises from two chords, called the fundamental concord and the fundamental discord; and from the different uses that can be made of them, by inversion, suspension, anticipation, and transition. And all musical harmony, even the most complicated, if only regular, is reducible to the said two chords; the fundamental note of which is called the fundamental bass... These two chords and their inversions therefore, may be called essential chords, in distinction from those which I shall call accidental ones." The harmonic system (i. e., in reality the Kirnberger system) which underlies all of Kollmann's work rests on the distinction between essential and accidental chords, in contrast with those systems in which each chord or each tonal combination was regarded as essential. In the chapter on "accidental chords," Kollmann quotes in detail how Rameau, Marpurg, and Kirnberger derive and use these chords. According to him, in Kirnberger the attention of the student and the performer is drawn to an essential chord by the appearance of any accidental chord while, on the other hand, in Rameau and Marpurg, the attention is diverted from the essential chords and each accidental chord must be recognized and figured as essential.

In the demonstration of cadences, Kollmann speaks of the then famous chord of the "sixte ajoutée" (F-A-C-D in C major), as it was named by Rameau. Kollmann distinguishes two kinds of "imperfect cadence":

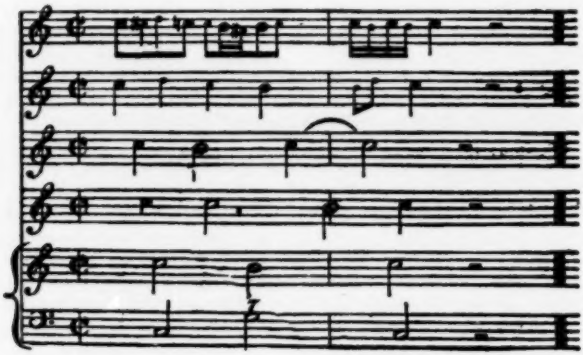
1) the "half cadence" or "retrograde perfect cadence" which proceeds from tonic to dominant and in which the first chord must be a major or minor triad; the second, a major triad or a dominant-seventh chord.

2) the "real imperfect cadence" which proceeds from subdominant to tonic, in major and in minor.

Rameau added a sixth to the penultimate chord of these two cadence forms and designated it as an "essential but irregular dissonance," which, contrary to the nature of the "real essential dissonance," must resolve upward. In Kirnberger, this sixth is not es-

Pedagogie," Paris, 1925, page 561. This interpretation is in no way supported by Kollmann himself, in any case, not in any of his theoretical writings. But, in fact, it seems unlikely, since it does not correspond with Kollmann's method to avoid naming names when dealing with the origins of his ideas. The Fétis-Chevaillier interpretation appears to emphasize a French national viewpoint more strongly than the facts justify!

sential but rather a passing tone which should be handled as such in its progression. (Parry[26], in his article on harmony in the first edition of Grove's Dictionary, points out that, for this chord, various theorists have given almost as many roots as there are tones: Rameau, originally, the subdominant; German theorists, the supertonic—as an inversion of a seventh chord; Day, the dominant—as an inversion of an eleventh chord without root and third; Helmholtz, again the subdominant in support of Rameau; and apparently Parry overlooked the fact that his countryman, Ouseley[27], established yet a fourth derivation for this chord—as the result of a "double root" common to both the supertonic and the dominant! As a fifth interpretation, Parry should have designated that of Kirnberger and Kollmann.)

On the title page of Kollmann's later harmony book, A New Theory, the first edition of which appeared in 1806 (cf. M. P. King's polemic against Kollmann's first harmony book on page 144), the musical example given below appears as a vignette. It is intended to be a concentrated demonstration of the complete "new" system:

Kollmann explains it in the last chapter:

"The two lowest staves contain the fundamental concord and discord, as the two only roots, from which all harmony arises, according to the nature of our modern scale. And the reason why I expressed only one part besides the fundamental notes, is to point that part out alone.

26. Charles Hubert Hastings Parry (1848-1918), professor of music at Oxford University and Director of the Royal College of Music, exercised an extensive influence on the English musical world as composer, musicologist, and teacher.

27. Frederick A. G. Ouseley (1825-1889), A Treatise on Harmony (1868).

"The third and fourth stave from below, shew the suspensions and interruptions, which arise from the mere syncopation of the very same notes. ["Interruption" is what Kollmann calls the opposite of a suspension, namely, the taking away of part of the value of a principle tone to allow an earlier beginning of the next following principal tone.]

"The fifth stave shews, how similar suspensions and interruptions arise, when the diatonic means are introduced, either before, or after, or on both sides of the same essential notes. N. B. The essential notes being expressed by larger, and the diatonic means, by smaller notes.

"And in the highest stave some chromatic means are introduced, as mere extremities of their respective diatonic degrees.

"The reason why no enharmonic changes have been added to that example, is: because they are as good as included in it. For they are nothing more than the same note treated like two notes of the difference of an enharmonic diesis (being the ratio 125/128—footnote by Kollmann), which the nature of our modern scale permits."

Each of the four variants shown in the four upper lines of the example may be used in any single voice of the harmony; "but wherever they are introduced, either single, or in any intermixture the ear will bear," the essential chords and tones remain the same as if they were not there. "And no essential chords or notes arise from any tolerable combination whatever, but the fundamental concord and discord expressed in the example in question, with their inversions, and with the different species of all of them, which the modern scale produces."

In this closing chapter, Kollmann himself raises the question of precisely why there should be no more and no less than two fundamental chords and establishes his viewpoint in detail. He makes the claim that, in contrast to his first study of harmony (cf. page 137), he has presented here a closed natural system as promised in the subtitle of this second work. Indeed, as stressed in the preface, it deals only with harmony as the grammatical aspect of the science of music; the rest, the nature and form of musical pieces, he calls the rhetorical, which he had written about separately in 1799 in An Essay on Practical Musical Composition.

In the first chapter of his late work — "of the System proposed in the present work" — Kollmann divides the existing systems into three groups:

"First, those by which all the intervals and chords are considered and explained according to their mere individual appearance.

"Secondly, those which depend partly, on the individual appearance, and in other parts on the proofs of the real nature of intervals and chords.

"And thirdly, those which depend entirely on the proofs, by which

a mere delusive appearance can be distinguished, from the real nature of intervals and chords."

The systems of the first group appear to be simple but are by no means so in reality. These systems know no rules by which to distinguish the false from the proper, the appearance from the fact; the variety of individual appearances requires an equivalent variety of rules in these systems; and should one desire to organize the plethora of instances under some general rules, one must also introduce countless rules for the exceptions. These systems were still possible as explanations of harmonic phenomenon so long as only a few chords and progressions were regarded as permissible; they were made obsolete as soon as the doctrine of a fundamental bass was recognized.

Kollmann includes Rameau's system in the second group (on the basis of the Traité, published in 1722 and translated into English in 1752)[28]:

"The chief leading principle in Rameau's system is: that all harmony must be reducible to a regular fundamental bass, as the proof of it. And in that respect it is perfectly true.

"But its inventor endeavoured to reconcile that leading principle, to the more antient one of considering and explaining every interval and chord according to its individual appearance; and this led him into the mistake, of explaining some suspensions as a sort of essential chords, under the denomination of chords by supposition."

Kollmann regards it as remarkable how Rameau had realized that all his chords by supposition could be explained simply as suspensions. Roussier, in his Traité des Accords et de leur Succession selon le système de la Basse Fondamentale (1764), spoke of suspensions similarly but still more forcefully. Marpurg differed from Rameau insofar as he (in his thoroughbass handbook, 1755) made the "supposed" thirds into fundamental tones; but the whole doctrine of chords by supposition were an error since they concern, as previously said, only suspensions.

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28. It might be assumed from Kollmann's formulations that the entire Traité existed in English translation; on the other hand, every official bibliographical source (the catalogues of the Library of the British Museum and of the Library of Congress in Washington, among others) speaks only of an English translation of the third and fourth parts of the Traité in the eighteenth century. It appears likely to me that Kollmann, because of the English title (see page 130) might have been led to the erroneous notion that it was a complete translation. My supposition is further supported by the fact that the second edition of the translation of the third part and the translation cited by Kollmann bear identical dates of publication and identical wordings for the main title. Burney fell into a similar error when he named "Rameau's Treatise on Music, translated. 1752" in his "chronological list of the important books which have been published on music in the present century in England" (at the end of the last volume of his music history, published in 1789).

Like Rameau, Tartini is said to belong also to this second group with his Trattato di Musica (1754), and his De Principii dell' Armonia Musicale (1767). Tartini is said to understand (according to Stillingfleet's translation[29]) only a complete chord under the concept of "system," but not the leading of one chord to another.

All the previous works written on harmony had favored more or less the old method—to designate each interval and each harmony for itself. But the more one does this, the more complicated the system must become. If rules have been given for a thousand combinations, so many other cases are omitted that were being successfully used in compositions. To the third and last group of systems belongs Kirnberger alone, who unfortunately stopped half-way — more than half of all the tones and tone-combinations that are useful in music are left unconsidered too arbitrarily and are not included in his system so that it remained incomplete. In completing Kirnberger, he, Kollmann, had succeeded, on the basis of his studies and teaching, in making a more comprehensive and complete system since 1796 "by which every note that is useful in music might have as positive a rule, as it denotes a positive sound," not, as with Kirnberger, just the principal and essential tones, but also as systematically all unessential and accidental tones. Kollmann, who generally achieves an objective tone, even when he speaks of his opponents, cannot resist observing the following: that just as America existed always before its discovery by Europeans, so did his system exist in the natural feelings of all previous good composers and authors, for all good tracts and compositions show that their authors felt what he (Kollmann) has demonstrated in his system, even if the authors could not have explained matters in the form of a complete theory; the stronger the natural feeling of these composers was, the less did their compositions take exception to the rules of his system. This fact is clearly evident from the compositions of Rameau, Tartini, Marpurg, and other famous composers whose theories differ from those presented in his present work.

The contents of his new system are summed up in his book, A Second Practical Guide to Thorough-Bass (1807), with the words: "all intervals and chords, which are in relation to others, shall not only be designated for themselves alone but also according to those qualities which they acquire from their relationship, and every note shall be given a positive rule as it has a positive sound."

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29. Benjamin Stillingfleet (1702-1771), an English writer, occupied himself with botany, agriculture, poetry, and music. His last work, to which Kollmann refers here, appeared anonymously in 1771 and was an annotated analysis of Tartini's Trattato; Burney praised this work of Stillingfleet highly. Stillingfleet is as strong an opponent of Rameau as he is a follower of Tartini whose treatise, as he writes in his foreword, he wishes to explain in an easier form for music lovers.

In 1800, Matthew P. King[30] published "A General Treatise on Music, particularly on harmony or thoroughbass and its application in Composition," the second edition of which appeared in 1809. He begins his book with an empty polemic against Kollmann, who he assumes to have written primarily against himself and Shield[31]: "finally, since Mr. Kollmann has called for and provoked an opinion on his innovating system, I think myself fully justified, from the written testimonies of the highest authorities, as well as from the greatest Professors in this Country, to say, that it not only annihilates all the higher branches of Harmony, but, compared with the received principles, which he arrogantly attempts to overthrow and supplant, that the crude notions he would substitute in their place, are at once puerile, fallacious, and incomplete."[32] King confesses unmistakably his high regard for Rameau and Marpurg. (The King-Kollmann controversy recalls the similarly conducted quarrel over similar matters between Marpurg and Kirnberger in Germany a few decades earlier.) The book contains some excellent practical compilations, as, for example, of all the usual ornamental signs in use up to that time and their performance, but it is a long way from being an independent theoretical work.

King takes over in its entirety the doctrine by which the whole harmonic system is built on two chords alone, the fundamental consonance and the fundamental dissonance; he calls them the chords of nature and, on the other hand, those which are derived from them, the chords of art. He understands the "new system" to be "another system, entirely different from either of the former, and wholly founded on the principles of vibration; or the natural succession of sounds," and that the chords of the ninth, eleventh, and thirteenth may be independently constructed by the stacking of thirds upward.

In the last part of his book, "on the Application of Harmony," King writes (at the beginning of Chapter I on "progression of the Fundamental Bass"): "the progression of the fundamental bass, is of so much consequence, that without a proper knowledge of its case, it is impossible to be either a correct harmonist, or a good composer."

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30. M. P. King (1773-1823), a well-known and well-liked composer of his time, whose work, mentioned above, found great recognition.

31. William Shield (1748-1829), a composer much-loved by the English public, primarily on account of his serene operas and musical plays, published, like many of his contemporaries, a practical guide to harmony and an introduction to the principles of thoroughbass.

32. A sensitive ear might discern here a kind of injured national pride and animosity toward the stranger from foreign lands; it is well-known that, at this time, broad ranks of the English people, particularly in the countryside, were openly against the foreign ruling family and its associates.

William Crotch[33], perhaps the most popular personality in the English musical scene of his time and professor of music at Oxford for almost half a century, published his book, "Elements of Musical Composition: comprehending the Rules of Thorough Bass and the Theory of Tuning," in 1812. The unusually energetic musical activity and development in the English universities, in contrast with those on the continent, begins with the professorship of Crotch.[34] It is not an exaggeration to assert that the strongest impulse was given English musical life, and therefore naturally the development of music theory, by the universities.

The contents of Crotch's book, from the point of view of music theory, would not indicate, at least at the time of its appearance, a particularly high standard at Oxford University. (It is known that the significance of Oxford and Cambridge Universities was greater in the sixteenth than in the eighteenth century; the situation was improved again in the nineteenth century.) Only in the last chapter are questions of music theory considered. Until then, for the most part, rules and facts are listed without any foundation or derivation in any scientific sense. In this chapter, Crotch speaks, among other matters, of the derivation of scales, tuning, temperament, and the monochord. After a brief exposition of the scale derivations of Pythagoras, Ptolemy and Tartini, it is explained in great detail how it is possible to derive scales exactly only by means of a monochord.

It appears that, despite the presumptuous makeup of the book and the prominent position of its author, its content was designed primarily for musical beginners, as the author himself indicates at the beginning of the preface: "a knowledge of the Elements of Musical Composition and of Thorough Bass is happily become almost indispensable to a Musical Education."

Without doubt Kollmann's complete theoretical works are the most significant of this time in England, as much with regard to their

33. William Crotch (1775-1847) appeared as a musical prodigy already at four years of age; Burney reports on him in 1779. He became an organist, theorist, and composer, professor of music at Oxford at the age of 24, in 1822, director of the Royal Academy of Music in London. His book on composition appeared in a new edition in 1856; his oratorio, Palestine, as W. Barclay Squire writes in his article on Crotch in the Dictionary of National Biography (1888), "achieved a lasting success, and remains practically the one oratorio by an English composer which has survived for half a century."

34. In 1844 only the universities of Oxford and Cambridge had professorships for music; in 1944 around thirty English universities had music professorships, not counting the number of university colleges that had not yet been recognized as complete universities. With regard to this, see Percy A. Scholes, "The Mirror of Music, 1844-1944, A Century of Musical Life in Britain as reflected in the pages of the Musical Times," 1947, Vol. 2, Chapter XIX: "The Universities and Music," page 649 ff.

completeness and orderliness as with regard to their progressive outlook. However, since the author was a foreigner who was conscious of his reliance upon a master of his native land (Kirnberger), his work made no lasting impression on the future; his influence remained associated with his own person as an author and his immediate circle.

Of the remaining theorists of this time, who, unlike Kollman, are of English ancestry, Jones is undoubtedly the most serious. A churchman, and above all a scholar, rooted in traditions from the distant past and conservative in his musical theoretical attitudes, he found nothing of importance in the musical activities of the time in his homeland upon which he could fasten his attention.

The two mentioned works of King and Crotch remain in the area of guides for purely practical purposes put together out of tried and true materials; they are good and useful compendiums but nothing more.

These closing remarks may serve to explain the fact that the few modern works concerned with the history of theory — in England proper, Matthew Shirlaw's The Theory of Harmony (London, 1917; reprint: Dekalb, Illinois, 1955)—pass over this period in absolute silence in their discussion of English developments.

SYMBOLISM IN ANCIENT CHINESE MUSIC THEORY

by

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Since the music of Ancient China was regarded as the image of the order of the Universe, its theory was closely related to number symbolism and to other symbolisms through number. The cyclic nature of the Universe and the interplay of Yang and Yin are the bases of music theory. Out of the Great Source the two opposing aspects, Yang and Yin, were generated; and out of the marriage of the two, all things between Heaven and Earth. Yang is Heaven, Yin is Earth; Yang is male, Yin is female; Yang is light, Yin is darkness; Yang is superior, Yin is inferior; Yang is odd, Yin is even, and so on. Yet nothing in human experience is either in a pure state. Music theory, being intimately bound up with this and related doctrines, is found for the most part in writings on the calendar, astrology and topology. Documents concerning music proper, such as the "Records of Music" in Li chi, and the "Book of Music" in Shih chi deal more with ethical than technical questions.

This article is based largely on the following writings:

Kuan-tzŭ

The writings attributed to Kuan-tzŭ (or Kuan Chung, d. 645 B. C.), but presumably of a much later date, around the third century B. C. Kuan-tzŭ was the prime minister to Duke Huan of Ch'i State. His statesmanship was responsible for making Ch'i the most powerful of the states of Chou. Where the duke asks Kuan-tzŭ for the right numbers for the administration of the state, the book is in dialogue form. His writing on music theory is found in the chapter on agronomy, along with classifications of land according to the distance from the surface to the underground water by the multiples of the number seven. It is the manipulation of numbers that relates music and agronomy.

Shu ching, The Canon of History

Documents compiled by Confucius (551 B.C.-479 B.C.) on the administration of the nation from the earliest times to his own time. Materials for symbolic numbers are found in "Hung fan" (The Great Plan), one of its chapters, which is said to have been given by the Supreme Being to Emperor Yŭ (on the throne 2286 B. C.).

Huai-nan-tzu

Writings on philosophy, politics and sciences, edited by Huai-nan-tzŭ, the Prince of Huai-nan (d. 122 B. C.), out of discourses with his learned guests. Materials on music

theory are found in the chapters on astrology and topology, and also interspersed in the chapters on ethics.

Shih Chi, The Historical Records

The first dynastic history, begun by his father, and completed by Ssŭ-ma Ch'ien in 97 B.C. Ssŭ-ma Ch'ien (135 or 145 B.C. -ca. 88 B.C.) was the historian to Wu-ti (on the throne from 140 B.C. to 88 B.C.) of the Former Han dynasty.[1] He was responsible for the reorganization of the calendar in 104 B.C. under Wu-ti. Shih Chi contains the "Book of Music" and the "Book of the Pitch-pipes."

Li chi, The Book of Rites

A collection of the documents on rites from the late years of the Chou dynasty[2] to the Former Han dynasty, compiled by the Confucian, Tai Shêng of the Han dynasty. One of the chapters, the "Records of Music," deals more with ethical questions on music, whereas "Yüeh ling," the "Monthly Commands," the chapter on regulations on the administration and the rites assigned to each month, is related to music theory.

Yüeh shu yao lu, A Summary of Books on Music

Brought to Japan from China, together with a set of copper pitch pipes, by Kibi no Mabi (693-775 A.D.) of Japan. He was a government scholar to China from 716 to 735 A.D. References are taken from the above mentioned "Yüeh ling," the "Treatise on the Pitch-pipes and Calendar" in the History of the Former Han Dynasty by Pan Ku (32-92 A.D.), and the writings of Cheng Hsüan (127-200 A.D.) of the Later Han dynasty[3] and others.

It should be pointed out that there was no essential change in the theory from Kuan-tzŭ to Kibi no Mabi, a period of about eleven centuries. The same sources were repeatedly used, that is, there was one accepted theory which was restated constantly. This theory concerns the generation of the twelve fundamental sounds by means of successions of perfect fifths, the first five sounds thus obtained being the basic tones of the scale.

* * * * * * * * * * *

1. The Former Han dynasty, 206 B.C. - 24 A.D.
2. The Chou dynasty, 1122 (?) B.C. - 256 B.C.
3. The Later Han dynasty, 25 A.D. - 220 A.D.

Pitch and Scale Systems

The legendary origin of the twelve fundamental sounds goes back to Huang-ti, the Yellow Emperor (2697 B. C.). He ordered one of his courtiers to go to Mt. K'un-lun to make pitch-pipes out of bamboo; the six Yang pipes according to the voice of the male of the allegorical bird fêng-hüang (Phoenix), and the six Yin pipes, to the responding call of the female bird. Although the legend continues to be repeated, an actual acoustical system is also attributed to Huang-ti.

The length of the fundamental pipe, huang-chung (yellow bell), is 9 ts'un[4], that is 8.1 ts'un by more recent measuring systems. The measuring system of the Chou dynasty was nonary. A ts'un had nine parts, hence nine ts'un, on a decimal system would be 8.1 ts'un. Eighty-one, then, is the number of huang-chung. Earlier documents use this number in calculation; later documents, nine. The lengths of the subsequent pipes are obtained by dividing each new one into three parts, and subtracting one part and adding one part alternately; that is, taking alternately a pipe shortened by 1/3, producing a pitch a fifth higher, and a pipe lengthened by 1/3, producing a pitch a fourth lower. In proportional fractions the former would be represented by 2/3, the latter by 4/3. The generation by 2/3, or progression up a fifth, is expressed as inferior (Yin), since the resulting pipe is shorter, that by 4/3, or progression down a fourth, as superior (Yang), since the resulting pipe is longer. In this arrangement, the six sounds obtained by superior generation are called Yang sounds; the other six, obtained by inferior generation, Yin. The twelve sounds thus obtained are reorganized into chromatic order and given special names of their own: huang-chung, ta-lü, t'ai-ts'ou, chia-chung, ku-hsien, chung-lü, jui-pin, lin-chung, yi-tse, nan-lü, wu-yi, and ying-chung. These tones are arranged to correspond to the months, beginning from the eleventh month, and through the gender of the months they acquire a confirmation of their gender designation; that is, all odd-numbered months and their corresponding sounds are Yang; all even-numbered months and their corresponding sounds, Yin. The generation series, however, does not lose its importance, even after the sounds from it are arranged into chromatic order. The calculation of the pitches by various writers are shown in Table I.

Two different orders of generation are observed in Tables I and II: one, the alternation of 4/3 and 2/3, used by Kuan-tzŭ; the other, the alternation of 2/3 and 4/3 till the seventh sound, followed by that of 4/3 and 2/3, used by the three later writers. As shown in Table I, Kuan-tzŭ stops at the fifth sound, dealing only with those sounds necessary for the basic scale of five tones. The values in his calculation of lin-chung and nan-lü (the second and the fourth sounds) must be halved for use in the scale.[5] In the second order, which is commonly accepted, the twelve sounds are kept within a range of an octave, the fundamental as the lowest sound. This is done by shifting the order of generation at the eighth sound. Instead of producing the eighth tone by inferior gen-

4. 1 ts'un equals approximately 1 inch.
5. Commentary by Sankuro Kikuchi (1911).

Table I

Part I

Names of the sounds	I Calculation by Kuan-tzŭ (ca. 3rd cent. B.C.)*	II Calculation by Huai-nan-tzŭ (2nd cent. B.C.)	III Calculation by Ssŭ-ma Ch'ien (1st cent. B.C.)	IV Corrections in Lü-lü hsin-shu** (12th cent. A.D.)	V Arithmetically correct numbers - K.N.
huang-chung	81	81	81		81
lin-chung	$81 \times \frac{4}{3} = 108$	$81 \times \frac{2}{3} = 54$	54		54
t'ai-ts'ou	$108 \times \frac{2}{3} = 72$	$54 \times \frac{4}{3} = 72$	72		72
nan-lü	$72 \times \frac{4}{3} = 96$	$72 \times \frac{2}{3} = 48$	48		48
ku-hsien	$96 \times \frac{2}{3} = 64$	$48 \times \frac{4}{3} = 64$	64		64
ying-chung	further calculations not given	$64 \times \frac{2}{3} = 42$	$42\frac{2}{3}$		$42\frac{2}{3}$
jui-pin		$42 \times \frac{4}{3} = 57$	$56\frac{1}{3}$	$56\frac{2}{3}$	$56\frac{8}{9}$
ta-lü		$57 \times \frac{4}{3} = 76$	$75\frac{1}{3}$	$75\frac{2}{3}$	$75\frac{23}{27}$
yi-tse		$76 \times \frac{2}{3} = 51$	$54\frac{2}{3}$***	$50\frac{2}{3}$	$50\frac{46}{81}$
chia-chung		$51 \times \frac{4}{3} = 68$	$61\frac{1}{3}$***	$67\frac{1}{3}$	$67\frac{103}{243}$
wu-yi		$68 \times \frac{2}{3} = 45$	$44\frac{2}{3}$		$44\frac{692}{729}$
chung-lü		$45 \times \frac{4}{3} = 60$	$59\frac{2}{3}$		$59\frac{2037}{2187}$

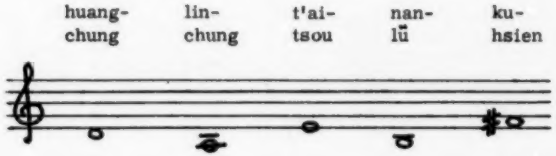
Table I
Part II

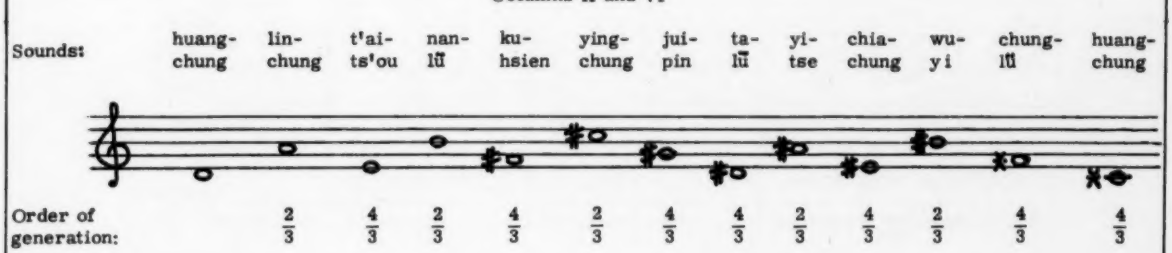
Names of the sounds	VI Calculation by Kibi no Mabi (8th century A.D.)	VII Ratio of each sound to the fundamental sound by Ssŭ-ma Ch'ien	VIII Value with a common denominator of $1 \times (3)^{11} = 177147$ by Huai-nan-tzŭ and Ssŭ-ma Ch'ien
huang-chang	9	1	177147
lin-chung	$9 \times \frac{2}{3} = 6$	$\frac{2}{3}$	118098
t'ai ts'ou	$6 \times \frac{4}{3} = 8$	$\frac{8}{9}$	157464
nan-lü	$8 \times \frac{2}{3} = 5\frac{1}{3}$	$\frac{16}{27}$	104976
ku-hsien	$5\frac{1}{3} \times \frac{4}{3} = 7\frac{1}{9}$	$\frac{64}{81}$	139968
ying-chung	$7\frac{1}{9} \times \frac{2}{3} = 4\frac{20}{27}$	$\frac{128}{243}$	93312
jui-pin	$4\frac{20}{27} \times \frac{4}{3} = 6\frac{26}{81}$	$\frac{512}{729}$	124416
ta-lü	$6\frac{26}{81} \times \frac{4}{3} = 8\frac{104}{243}$	$\frac{2048}{2187}$	165888
yi-tse	$8\frac{104}{243} \times \frac{2}{3} = 5\frac{451}{729}$	$\frac{4096}{6561}$	115192
chia-chung	$5\frac{451}{729} \times \frac{4}{3} = 7\frac{1715}{2187}$	$\frac{16384}{19683}$	147456
wu-yi	$7\frac{1715}{2187} \times \frac{2}{3} = 4\frac{6524}{6561}$	$\frac{32768}{59049}$	98304
chung-lü	$4\frac{6524}{6561} \times \frac{4}{3} = 6\frac{12974}{19683}$	$\frac{131072}{177147}$	131072
huang-chung	$6\frac{12974}{19683} \times \frac{4}{3} =$ ****		

* Kuan-tzŭ himself lived in the seventh century B.C. but later writings were attributed to him.
** The New Discourses on the Pitches
*** These are probably errors in manuscripts.
**** Purposely omitted because this sound should, for symbolic purposes, be identical with huang-chung, but this result is not achieved by the arithmetical operation indicated.

Table II

The transcription of the values given in Table I into musical notation would produce the following:

Column I

Columns II and VI



eration (which would result in placing the eighth and consequently the tenth and twelfth sounds above the octave range), superior generation is repeated at the eighth sound, producing an octave transposition downward of a perfect fifth.

This, however, causes an apparent contradiction in two previous statements: that, the sounds produced by superior generation are Yang, and those by inferior generation, Yin; that the sounds applied to the odd numbered months are Yang, those to the even numbered months, Yin. When the generation series is rearranged into the chromatic series (Figure 1), it is noted that the first seven sounds are all Yang and the last five, all Yin, according to the nature of their generation, whereas they should be alternately Yang and Yin according to the gender designation of the corresponding months.

However, if the calculation were made theoretically and the order of the alternation of 2/3 and 4/3 followed unchanged, with no consideration of the range, the two statements would conform to each other (Figure 2).

The two statements remain valid notwithstanding the result of the actual calculation. Huai-nan-tzŭ is aware of the contradiction. In speaking of the tones of the seven-tone scale, which are the primary seven sounds of the generation series, he states that the first six are concordant as they follow the right order; and the seventh, discordant as it upsets the order.[6] What he means is that the seventh sound, produced by superior generation, produces the eighth sound again by superior generation, which is against the order. Kibi no Mabi simply states that the sounds of the first seven months, beginning from the eleventh month, are produced by superior generation; and those of the last five months, by inferior generation.

The numbers in Table I represent the lengths of the pipes, and at the same time, the numbers of the sounds themselves. For example, "the number of huang-chung is eighty-one." The earlier three — Kuan-tzŭ, Huai-nan-tzŭ, and Ssŭ-ma Ch'ien — use eighty-one as the number of the fundamental sound. Kibi no Mabi, of a much later period, who still collects documents from the same sources as the other three as well as those from a later date, uses nine as his basic number. In this way he relates his numbers to those of divination, as will be shown later. Huai-nan-tzŭ keeps the numbers in integers. Ssŭ-ma Ch'ien goes into fractional numbers, though keeping the fractional denominator to 3.

In addition to the calculation of the pitches, he gives the ratio of each sound in reference to the fundamental sound (see Table I, column VII). The value of each sound with a common denominator is given both by Huai-nan-tzŭ and Ssŭ-ma Ch'ien (see Table I, column VIII), but no more by Kibi no Mabi, although it is found in the "Treatise on the Pitch-pipes and Calendar" in the History of the Former Han Dynasty, to which he refers often.

6. Huai-nan-tzŭ: Chapter on Astrology.

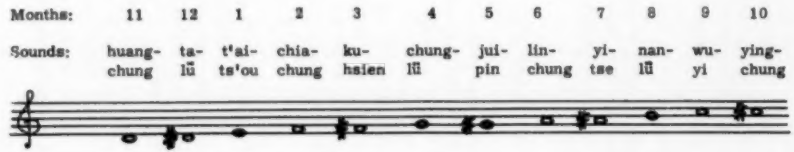

Months: 11 12 1 2 3 4 5 6 7 8 9 10
Sounds: huang-chung ta-lü t'ai-ts'ou chia-chung ku-hsien chung-lü jui-pin lin-chung yi-tse nan-lü wu-yi ying-chung
Designated gender: yang yin yang yin yang yin yang yin yang yin yang yin
Gender by the generation: yang yang yang yang yang yang yang yin yin yin yin yin
Actual Generation: 4/3 4/3 4/3 4/3 4/3 4/3 4/3 2/3 2/3 2/3 2/3 2/3

Figure 1

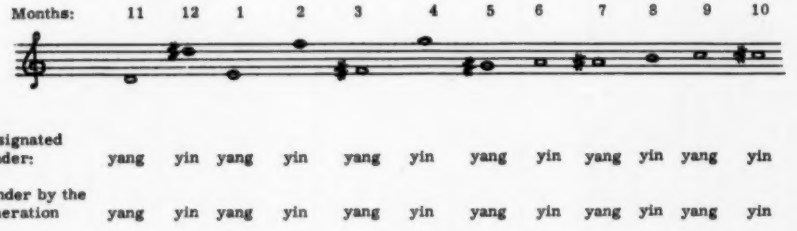

Months: 11 12 1 2 3 4 5 6 7 8 9 10
Designated gender: yang yin yang yin yang yin yang yin yang yin yang yin
Gender by the generation yang yin yang yin yang yin yang yin yang yin yang yin

Figure 2

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To maintain the pure relationship between Yang and Yin and to close the cycle, a basic symbolic necessity in the Chinese concept of a universal image, it is necessary to keep the interval of the fifth correct, and at the same time, to keep the octave correct. But these are irreconcilable aims. A succession of perfect fifths results in a deviation of the octave by a Pythagorean comma. And to maintain the closed cycle of an octave, adjustment must be made in the fifths. Various solutions are proposed. Huai-nan-tzŭ distorts the numbers from the sixth sound on in such a way that they form three pairs of perfect fifths, leaving the sixth sound out of tune with the whole system, as in Figure 3.

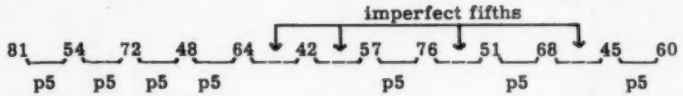


Figure 3

The final sound produces the fundamental sound of 80 by superior generation (60 x 4/3 = 80). This sound should, of course, be 81. Huai-nan-tzŭ is aware of this. To prevent the establishment of this new fundamental sound (80), he states that there can be no generation, superior or inferior, after the final sound. Ssŭ-ma Ch'ien, in spite of his greater accuracy, is actually less successful than Huai-nan-tzŭ in the correctness of the fifth. All the numbers after the seventh sound, though much closer to the arithmetically correct numbers, do not make perfect fifths to either of their neighbors. Moreover, the fundamental sound produced from the final sound by superior generation is 79 5/9, a still greater discrepancy than that of Huai-nan-tzŭ. Kibi no Mabi maintains correct fifths throughout and states that the final sound closes the cycle by producing the fundamental sound by superior generation. But he discretely refrains from giving the number which would be 8 51896/59049, not yet in accord with the original value of the fundamental, 9. Thus no theoretical solution is found in any of the above documents. However, the numbers by Huai-nan-tzŭ, according to Marcel Granet[7], are those generally accepted.

As shown, the generation of the twelve fundamental sounds by calculation with fifths is a fixed fact in Chinese theory. But these different methods of describing the calculation exist: 1) the method of triple division already shown, 2) the method of the eighth ascending and sixth descending chromatic, and 3) the method of an eighth chromatic progression. The first method is that of "losing and gaining one-third" in a literal translation, which is used in all the documents referred to.

7. La Pensée Chinoise, page 223.

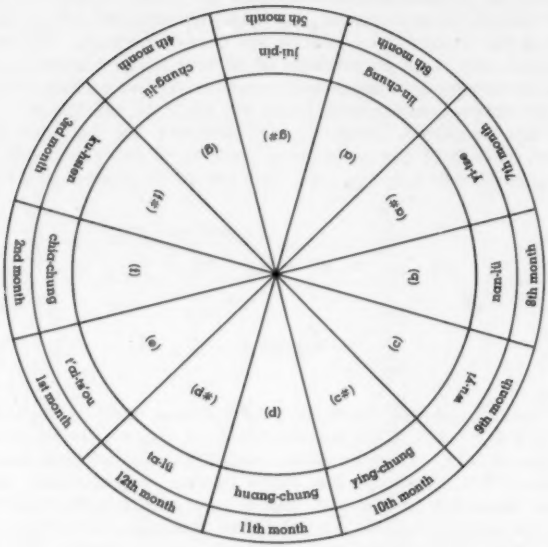


Figure 4

The latter two are found in Kibi no Mabi, based on the schematic diagram given in Figure 4. These systems presuppose the existence of the twelve sounds, each with a fixed monthly designation. The word chromatic or semitone is not used. In fact, no intervallic designation is known. It is therefore necessary to count by month numbers. The second method is expressed as eighth month to the left on the cycle and sixth month to the right. Likewise, the third method is expressed as a progression by eight months to the left successively.

As to the pitch standard, huang-chung, the fundamental sound is arbitrarily taken as f' by Joseph M. Amiot[8], e' by Maurice Courant[9] and d' by J. A. Van Aalst[10], Chao Mei-pa[11] and Tsunezo Yoshida[12]. Among the documents hitherto referred to, only Kibi no Mabi gives the diameter of the pipe. Quoting Chen Hsüan, he states that the length of the pipe is 9 ts'un, the diameter 3 fen (.3 ts'un) and the circumference 9 fen (.9 ts'un). However, the volume of the pipes must have been well-known, for weights and measures were derived from the pipe of huang-chung. The standard pitch-pipes made of jade or copper are described

8. Mémoires concernant l'histoire, les sciences, les arts, les moeurs, les usages, etc. des Chinois. Vol. 6.
9. Essai historique sur la Musique Classique des Chinois.
10. Chinese Music.
11. The Yellow Bell.
12. Shomyogaku Gairon (A Survey of Buddhist Psalmody).

"The Five Voices"

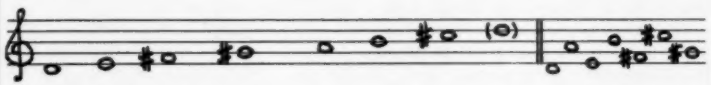
As a scale: In order of generation:

kung shang chio chih yü*

Figure 5

"The Seven Voices"

As a scale: In order of generation:



kung shang chio pien-chih chih yü pien-kung (kung)

Figure 6

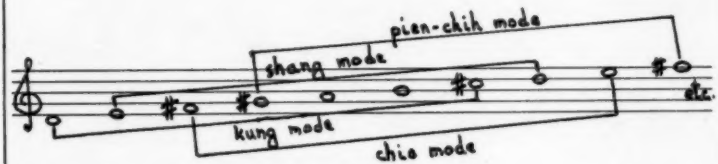


Figure 7

*Note that these names, they might be called functional names, are different from the names given to each pitch in the chromatic order of tones.

by Kibi no Mabi[13]. Absolute pitch, however, was not of great concern, since music was directly related to the voice which determined its range.

The greatest concern of the theory is not the determination of absolute pitches but the arrangement of the five basic tones in hierarchical order. Those are the five primary sounds of the generation series arranged in an order of ascending pitches as in Figure 5.

They are referred to as "The Five Voices," and remain the basis for all tonal orders. Each tone is called by its hierarchical name: kung – prince, shang – minister, chio – people of the empire, chih – affairs of the people, and yü – property.[14] They are never referred to by the cardinal numbers such as the first degree, second degree, etc. of the scale. Kuan-tzŭ speaks of these five tones only; and, as shown before, his calculation of the pitches ends here. Later, the next two sounds of the generation series were added, making "The Seven Voices" as shown in Figure 6.

These additional tones, known as pien tones in the West, have no independent names of their own. Huai-nan-tzŭ calls them by their names in the chromatic series, thus: kung, shang, chio, chih, yü and ying-chung and jui-pin. That is, as if to say, tonic, supertonic, mediant, dominant, submediant and c♯ and g♯. The expression pien-chih and pien-kung is found in the "Treatise on the Pitch-pipes and Calendar" in the History of the Former Han Dynasty. Kibi no Mabi follows suit. As the naming system shows, the two pien tones were not regarded as equal in importance to the "Five Voices."

To construct the modes, the initial tone of the "Five or Seven Voices" is changed, although the inner relationship remains the same, as in Figure 7. This results in five or seven different modes, the order of the tones in each being as follows:

Kung mode: kung, shang, chio, pien-chih, chih, yü, pien-kung.
Shang mode: shang, chio, pien-chih, chih, yü, pien-kung, kung.
Chio mode: chio, pien-chih, chih, yü, pien-kung, kung, shang.
Pien-chih mode: pien-chih, chih, yü, pien-kung, kung, shang, chio.
Chih mode: chih, yü, pien-kung, kung, shang, chio, pien-chih.
Yü mode: yü, pien-kung, kung, shang, chio, pien-chih, chih.
Pien-kung mode: pien-kung, kung, shang, chio, pien-chih, chih, yü.

13. There exists a set of pitch-pipes made of bamboo in Ontoku-in Temple in Kyoto, presumably an imitation of the Chinese one, made in the early fifteenth century by a monk for use in Buddhist psalmody.

14. Note that these names, they might be called functional names, are different from the names given to each pitch in the chromatic order of tones.

Each mode can thus be transposed to begin on each tone of the chromatic series, resulting in sixty (5 x 12) modes[15] for the "Five Voices," eighty-four (7 x 12)[16] for the "Seven Voices." The names of three hundred and sixty modes applied to each day of the year are given in the "Treatise on the Pitch-pipes and Calendar" in the History of the Sui Dynasty.[17] However, such a large system, being of hypothetical nature, is no longer taken up by Kibi no Mabi of the period following Sui.

* * * * * * * * * * *

Number Symbolism and Music Theory

In number symbolism there is often very little distinction made between cardinal and ordinal numbers. Or rather, in most cases, numbers as symbols result from the abstraction of the numerical idea from the reality of counting. For instance, five, which is 3 plus 2, has the nature of "fiveness" rather than that of some number greater by one than four. A number has a "quality" which is determined by its abstract derivation.

Cardinal Numbers

"First is Heaven, second is Earth, and third is Man." This statement is found in the chapter on topology in Huai-nan-tzŭ. However no musical equivalence is mentioned. This idea of trilogy in music theory is found in the "Treatise on the Pitch-pipes and Calendar" in the History of the Former Han Dynasty, where the first tone of the generation series is considered as the representation of Heaven, the second tone, of Earth, and the third tone, of Man. They are huang-chung, lin-chung and t'ai-ts'ou, or d', a', and e', in Western equivalents. But this idea is not taken up by such later writers as Kibi no Mabi. Cardinal numbers are attached to the months to which the chromatic series is applied. However, the cardinal numbers of the months are not substituted for the names of the corresponding tones of the series. Nor are they substituted for the names of the scale tones, neither for the "Five Voices" nor for the "Seven Voices." Cardinal numbers, therefore, have no immediate relationship to music theory.

Ordinal Numbers

The following statements are current in the books cited previously and in I ching (The Book of Changes):

Odd and even numbers — The numbers of Heaven are 1, 3, 5, 7, 9. The numbers of Earth are 2, 4, 6, 8, 10. In short, odd numbers are Yang, and of Heaven; even numbers, Yin, and of Earth. This corresponds to the Yang and Yin designations for alternate sounds of the

15. Huai-nan-tzŭ and Ssŭ-ma Ch'ien.
16. Kibi no Mabi.
17. Referred to in the "Treatise on Musical Pitches" in Yü han shang fang chi yi shu.

chromatic series (Figure 8).

Months	Names of the Sounds	Gender	Equivalent Western Names
11th	huang-chung	Yang	d
12th	ta-lü	Yin	d#
1st	t'ai-ts'ou	Yang	e
2nd	chia-chung	Yin	f
3rd	ku-hsien	Yang	f#
4th	chung-lü	Yin	g
5th	jui-pin	Yang	g#
6th	lin-chung	Yin	a
7th	yi-tse	Yang	a#
8th	nan-lü	Yin	b
9th	wu-yi	Yang	c
10th	ying-chung	Yin	c#

Figure 8

The total of the numbers of Heaven (1 + 3 + 5 + 7 + 9) and those of Earth (2 + 4 + 6 + 8 + 10) is 55 and represents the Universe.

One. — Out of the Great Source, the two aspects Yang and Yin are born; and out of them, all things between Heaven and Earth. Number proper begins in one and is fulfilled at three. Three is the beginning of compound numbers. The uniqueness of one, its unmultipliability and indivisibility, affects its symbolic interpretation. One is ascribed to the Great Source in the sense that it is the source of two. However, one is also the number of Heaven, or Yang, which already is the product of the Great Source. And in the explanation of divination symbols, the Great Source is expressed by a circle as being complete and void. Therefore, in acoustical theory, there are few occasions when one plays a prominent role. Ssŭ-ma Ch'ien uses one as the fundamental tone when calculating the ratios of the eleven other tones, which is done through multiplying by successive powers of three. Kuan-tzŭ describes explicitly the method of obtaining the fundamental tone of the "Five Voices" on the basis of one: "Set one as the basis. Multiply by three [1 x 3]. Multiply by four powers which is identical to nine times nine [$(1 \times 3)^4 = 9 \times 9$]. This is the number of huang-chung. Take this tone as kung."[18] Three is the most important number for acoustical calculation. Even in the above instances where one is basic, the actual working factor is three. The generation of tones is based entirely on a division by three, either in the form of 2/3 or 4/3. Also 3^2 or 9 and 3^4 or 81 were the lengths used for the fundamental pitch-pipes.[19]

Two and three. — The number of Heaven is three, and of Earth, two; because, as the ancient Chinese thought, Heaven is round and Earth

18. Chapter on agronomy.
19. Cf. Table I.

is square. In a circle, the ratio of the diameter and the circumference is approximately 1:3. The unit of the circumference is one.[20] Therefore, the number of a circle is three. In a square, the ratio of one side and the perimeter is 1:4. The unit of the perimeter is two.[21] Therefore the number of a square is two. The ratio of sounds in the generation series is 3:2, although not always reduced to simple numbers. For example:

huang-chung: lin-chung = 81:54 = 3:2

lin-chung: t'ai-ts'ou = 54:72 = 3:4 (octave transposition of 2 to be 4)

This is the only ratio in their systems, the interval of the perfect fifth, a combination of Yang and Yin.

Five. — Five is the number of Heaven and Earth, since it is the combination of Yang and Yin (3 + 2). It is the central number. Note also that the numerical symbol of the Universe, 55, derives a double meaning from the meaning of 5. Five corresponds to the "Five Voices," imparting to them particular perfection. Kuan-tzŭ[22] considers the arrangement of the "Five Voices" to antedate the ordering of Heaven and Earth. He attributes this action, as well as the organization of the twelve chromatic sounds, to Huang-ti, an early emperor of divine nature. After arranging the "Five Voices," he made the Five Elements[23] which were already in existence but were nameless. Then he ordered the harmony between Heaven and Man, and between Heaven and Earth.

Six and nine.— Six represents Yin. Nine represents Yang. According to the terminology used in the Book of Changes, six is old Yin, and nine, old Yang. These correspond to the numbers of the fundamental Yin and Yang sounds used by Kibi no Mabi. As shown on page 153 the length of the pipe, and consequently the number, of huang-chung, the fundamental Yang, is nine; and that of lin-chung, the corresponding Yin, six. Nine is three groups of three, the first complete number; and six, two groups of three. Chu Hsi in Explanation of the Changes for Beginners gives an explanation of the terminology old Yin and old Yang which shows another viewpoint concerning numbers. According to him, Yang numbers progress and Yin numbers retrogress. Yang numbers, pro-

20. A circle was understood as equivalent to a triangle of three equal sides. In a triangle, each side is different in its position and cannot be grouped on the basis of common directions. Therefore, the unit of the number of one side is one, making the number of a triangle, and consequently the number of a circle, three. In a square, the upper and lower sides can be grouped into one double line $=$, and the right and left sides into another double line $\|$. Therefore, the unit of the sides in a square is two. Having two such units, the number of a square is two. (Chu Hsi: Explanation of the Changes for Beginners)

21. Cf. footnote 20.

22. Chapter on the Five Elements.

23. Wood, fire, earth, metal and water.

gressing from seven, the young Yang, end at nine, the old Yang. Yin numbers, retrogressing from eight, the young Yin, end at six, the old Yin. This observation is made regarding the generated numbers,[24] that is, numbers beyond five. Six is applied also to the "Six Sounds" which stand for the whole series of twelve sounds, six Yang sounds representing their corresponding Yin sounds as well. Music is referred to by the early writers as the "Five Voices" and the "Six Sounds."

Four and eight. — Four and eight have very specialized meanings in connection with the directions and the Five Elements which will be explained later. A series of multiplications by two — 2, 4, 8, 16, 32, 64 — is applied indirectly to acoustical theory only when an attempt is made to reconcile the tonal system and the system of divination. This appears in comparatively late writings and will be taken up later.

Two, in direct connection with acoustical theory, implies the octave, although the word is not used. In fact no intervallic designation such as the octave and the perfect fifth exists in Chinese theory of the time. Kuan-tzŭ speaks of 4.5 ts'un as the length of the small huang-chung, half the length of its fundamental. Kibi no Mabi states that a tone remains the same whether multiplied or divided by two. Two must be combined with three to produce any new tones; in other words, Earth is not fruitful without Heaven, Yin is incomplete without Yang.

Generating and Generated Numbers

The numbers used in symbolic arrangements are divided into two groups, making five the central factor. The numbers from one through five are generating numbers. The numbers from six through nine, or ten, whichever the case may be, are generated numbers which are built on five.

Generating numbers	Generated numbers	Related pairs of generated and generating numbers		
		Yang		Yin
1	6	1	⟷	6
2	7	7	⟷	2
3	8	3	⟷	8
4	9	9	⟷	4
(5)	(10)	(5	⟷	10)

Figure 9

As shown in Figure 9, Yin generated numbers are in reality the extension of the Yang number series; and Yang generated numbers, the extension of the Yin number series. This mixture of Yang and Yin aspects has already been shown in classifying the sounds of the chromatic series, some of which contradicted the gender inherent in their gen-

24. See Figure 9.

eration. The related pairs of numbers are assigned to the "Five Voices," the Five Elements, and the Five Directions[25] in accordance with certain more elaborate numerical diagrams to be given later.

Nonary, Decimal and Duodecimal Systems

The measurement system of the Chou period, from which the earliest references in the present paper are drawn, is said to have been nonary. The origin of the symbolic cycle of nine is found in Lo shu[26], one of the earliest diagrams of symbolic numbers. It is said to have appeared on the back of a sacred tortoise at the time of Emperor Yü (ca. 2205 B.C.). To the same emperor, Heaven gave "Hung fan" (the Great Plan) which consisted of nine commandments. The nonary system predominates in acoustical theory in that the tonal system is based entirely on divisions by three, which is the square root of nine.

The origin of the symbolic cycle of ten is found in Ho t'u[27], a diagram paired with Lo shu to show two symbolic aspects of the Five Elements. Ho t'u is said to have appeared on the mane of a dragon-horse at the time of the mythological emperor Fu Hsi (ca. 2910 B.C.). The origin of the five-stringed zither and the divination signs is attributed to the same emperor. As Ho t'u is combined with Lo shu in symbolic operations, the decimal system is combined with the nonary system in acoustical theory for the purpose of actual calculation.

The decimal system again is combined with another system, the duodecimal. These two systems are the double of the "Five Voices" and the "Six Sounds" respectively, although in reality the numbers of the sounds need not be multiplied, since there are twelve of them already.

Concurrent cycles of the decimal and duodecimal series meet at sixty which is the point of orientation. Sixty is the number of the modes in the system of the "Five Voices." It also is the interval of a major second, expressed by Kibi no Mabi, as at a distance of two months (= sixty days).

Cyclic Infinity

Since music is the image of the Universe, it must have, like the Universe, an endless or infinite nature. This aspect can be numerically expressed in a cyclic form, a series that always ends where it begins. The "Five Voices," the "Seven Voices," and the twelve sounds, both in the generation series and the chromatic series, all return to the beginning, making a perpetual cycle, a type of infinity. Together with other cycles related to numbers, all musical cycles are fitted into the decimal and duodecimal series, (the "Seven Voices" being reduced to the

25. The center added to the four directions.
26. For the specific diagram, see Figure 11.
27. For the specific diagram, see Figure 10.

primary five tones) which are congruent only at sixty, the point of orientation, the symbol of a complete cycle. The reverse statement is possible, that all cycles are reducible to a cycle of five through a symbolic operation, which will be taken up in the following section. However, what is to be stressed here is that the point of orientation in cyclic infinity is made possible through the concurrence of decimal and duo decimal cycles: the two forms of the combination of three and two, 2(3+2) and 2(3x2) respectively.

The infinity resulting from an endless series of ordinal numbers finds no counterpart in music theory. Its mysterious nature expresses only the infinity of creation out of the Great Source and allows for no other symbolic uses.

* * * * * * * * * * *

Other Symbolisms and Music Theory

Important symbolisms other than number symbolism related to music theory are those pertaining to the Five Elements, the calendar and divination. Their relationship to music is maintained through number. They are all ultimately correlated with the Five Elements and numbers associated with the Five Elements.

The Five Elements

It has become clear in the previous section that the basic idea which governs acoustical theory is the doctrine of Yin-yang manifest in the numbers two and three. There is another concurrent doctrine which underlies Chinese thought. It is the doctrine of the Five Elements which grew out of observation of the five planets. Just as the Yin-yang doctrine governs acoustical theory concerning pitch calculation and determination of the harmonious interval, 3:2, the doctrine of the Five Elements governs music theory concerning the scale through the mutual numerical basis of five. Consideration of the scale comes after the basic pitches are established. And incidentally, five, the number of the Universe and of the "Five Voices" comes after three and two, the numbers of Heaven and Earth, and of pitch generation.

By the Five Elements, wood, fire, earth, metal and water are meant. The Chinese word wu-hsing stands for the Five Movers, though translated usually as the Five Elements.[28] They represent two kinds of movement: one, the movement in the order of generation, or the basic order, and the other, the order of conquest. The basic order is as given above: wood, fire, earth, metal and water. The order of conquest is wood, earth, water, fire and metal, a series of conquests, one element over the next adjacent element of the basic order. The former represents the phenomena in a normal state; and the latter, in a state of change. Ho t'u and Lo shu, the two earliest diagrams of symbolic

28. Fung Yu-lan: A History of Chinese Philosophy, vol. II, page 21, footnote.

Ho t'u
(showing the basic order)

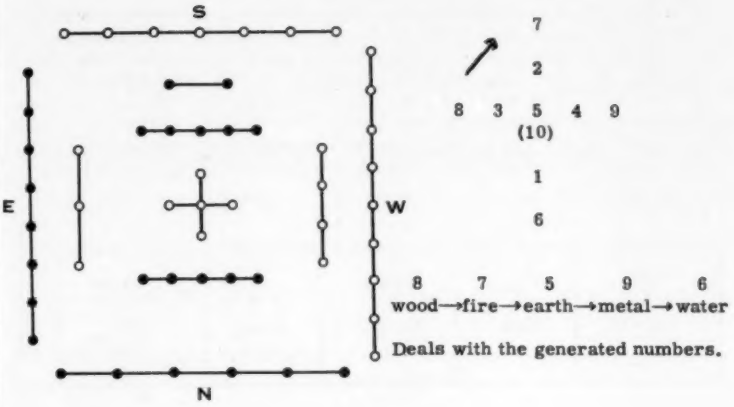


Figure 10

Lo shu
(showing the order of conquest)

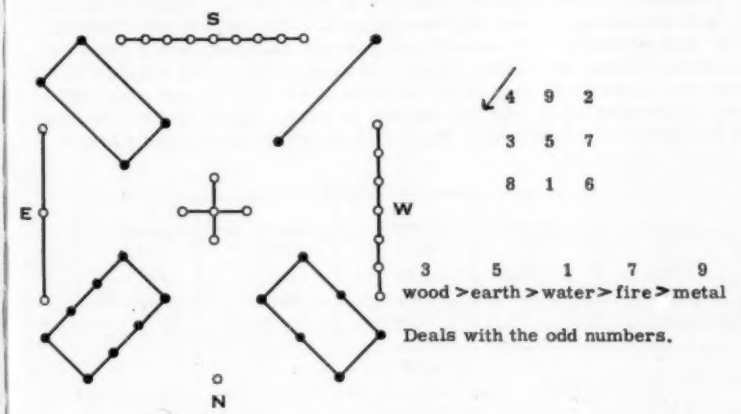


Figure 11

numbers, mentioned on page 163 and shown in Figures 10 and 11, demonstrate the two orders.

The numbers attached to the elements are as follows: wood-8, fire-7, earth-5, metal-9, water-6.[29] Earth, being the center of the Elements, receives five, the central number. The most obvious relationship between the Elements and music theory is the coincidence of their actual numbers and those of the "Five Voices." But more significant is the fact that the latter receive the symbolic numbers through the former. Hitherto no numerical designation has been given to the "Five Voices." They were never called by cardinal numbers such as the first tone, the second tone, but by the hierarchical names such as kung, the prince and shang, the minister. For the first time here, they receive numbers of their own through the corresponding Elements as shown in Figure 12.

wood	fire	earth	metal	water
8	7	5	9	6
chio	chih	kung	shang	yü
(f♯)	(a)	(d)	(e)	(b)[30]

Figure 12

It is clear that kung, the first tone of the scale, should be the equivalent of earth, the center. And the rest of the combinations also are not arbitrarily chosen. The numbers (transcribed into generating numbers), the Elements, and the Voices are arranged in a decreasing order, the numbers from large to small, the Elements from "with form" to formless, and the Voices from low to high pitch,[31] or from turbid to clear according to the expression used. To the ancient Chinese, water was formless. Fire was formless but assumed form by attaching itself to things with form. Wood had form. Metal was heavier than wood, and accordingly had more definite form. Earth was most definitely with form as it was the largest in size. (Here the idea of soil and the globe were confused.) Figure 13 shows this decreasing order.

earth	metal	wood	fire	water
5	4(9)	3(8)	2(7)	1(6)
kung	shang	chio	chih	yü
(d)	(e)	(f♯)	(a)	(b)

Figure 13

29. In Kuan-tzŭ, Huai-nan-tzŭ and "Yüeh ling" the generated numbers are used as shown above, whereas in "Hung fan" the generating numbers are used, thus: 3, 2, 5, 4, 1.

30. On the fundamental sound, huang-chung.

31. Decrease of the length of the pipe, or that of pitch numbers.

Another significance of these numbers is their equivalence to the pitch numbers of the "Five Voices" on the fundamental sound, huang-chung. Although 9 is the fundamental number in pitch determination, 8 is suggested by Marcel Granet as a common factor.[32] That is, since there is a possibility of the fundamental sound being 80 (= 60 x 4/3) instead of 81, division by 8 could be substituted for division by 9, accepting the affinity of 80/8 to 81/9 where arithmetical exactitude is not required. The pitch numbers of the five scale tones on huang-chung, when divided by 8 according to the above suggestion, coincide approximately with the elemental numbers given to the scale tones, as in Figure 14.

huang-chung	t'ai-ts'ou	ku-hsien	lin-chung	nan-lü
kung	shang	chio	chih	yü
81	72	64	54	48
$\frac{81}{8}$ = approx. 10 (or 5)	$\frac{72}{8}$ = 9	$\frac{64}{8}$ = 8	$\frac{54}{8}$ = approx. 7	$\frac{48}{8}$ = 6

Figure 14

As to the relationship between the two orders of elemental movement and the Voices, positional equivalence is drawn from the basic order, or the order of Ho t'u. The basic order shows the hierarchical order of the scale tones spoken of in early writings;[33] kung, the central tone is surrounded by its subordinates. To its left and right are the two immediate tones of the generation series, chih and shang, followed by the remoter two, yü and chio, as in Figure 15.

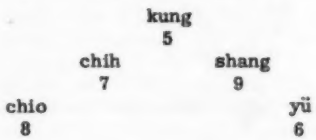


Figure 15

No musical equivalent is found for the order of conquest, the order of Lo shu.

Other symbols related to the "Five Voices" through the Five Elements by sharing the numbers in common are: the Ten Heavenly Stems[34] (commonly known as the ten days), the four seasons and the four directions both with the center added to them (Figure 16).

32. La Pensée Chinoise, pp. 231-2.

33. Cf. page 158.

34. The decimal series, a pair of elder and younger brothers related to each tone of the "Five Voices."

The Five Elements	wood	fire	earth	metal	water
The Numbers	8	7	5	9	6
The "Five Voices"	chio	chih	kung	shang	yu
The Ten Heavenly Stems[35]	a a'	b b'	c c'	d d'	e e'
The Seasons	spring	summer	center	autumn	winter
The Directions	east	south	center	west	north

Figure 16

The Ten Heavenly Stems, or the five pairs of elder and younger brothers are directly derived from the "Five Voices." Both the seasons and the directions are immediately connected with music. There is a passage in Chapter VIII of Kuan-tsŭ where it says that the music of the north must be played in summer, and that of the south in winter, in order to counteract the climate. In another place in the same chapter, however, he warns of a disaster if the music of another season is used. (This idea is common in the writings on the regulations of the months.) Further, in the chapter on agronomy where classification of the land is made according to directions and climates, he describes the pitches of the languages of the inhabitants by the corresponding tones of the "Five Voices." Besides these, color, taste, smell, organs, animals and crops are assigned to the Elements. None of these, however, have any direct relation to music.

The applications of such groupings are stated in "Yüeh ling" or the "Monthly Commands" in Li chi, and the "Regulations of the Months" in Huai-nan-tzŭ, and in similar writings concerning monthly rites. They designate the ritual, administration, and the emperor's personal conduct in accordance with the Elements of the month. Concerning music, the scale tone of the season and the pitch of the month are given both in "Yüeh ling" and the "Regulations of the Months." It is simply stated that the number of the first month is eight (being spring), its tone shang, and its pitch t'ai-ts'ou; and that the number of the second month is eight, its tone shang, and its pitch chia-chung, and so on. It must be assumed that music of the shang mode on the pitch, t'ai-ts'ou (e), be played in the first month; and music of the same mode on the next pitch, chia-chung (f), in the second month. Huai-nan-tzŭ alone designates the instruments to be played in accordance with the Elements of the seasons: zither and lute for spring, a gourd mouth-organ for summer, bells for autumn, and soundstones for winter.

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35. For convenience the Chinese names are here replaced by letters of the alphabet.

The Calendar

Huai-nan-tzŭ, in his chapter on astrology, states, that in organizing the calendar, the winter solstice must be confirmed, then the twenty-eight constellations must be calculated and arranged with respect to the twelve sounds (i.e., the twelve months). Because of its direct connection with the months, the chromatic series is inseparable from all calendar calculations, just as the "Five Voices" are inextricably bound to the Five Elements. And the chromatic series, as well as the calendar, is closely related to the Yin-yang doctrine.

The tonal series begins from the eleventh month, the month of the winter solstice which is the meeting point of Yang and Yin. According to the inevitable cycle of birth, growth, maturity and dormancy in all things of the Universe, Yang is at its nadir, or the Yang aspect is most completely stored inside the earth at the time of the winter solstice, whereas Yin is at its zenith. Since it is the time of the greatest dormancy of Yang, ready for birth, the month of the winter solstice is attributed to huang-chung, the fundamental Yang sound. Beside the tonal series, the zodiac, the Twelve Earthly Branches, is also related to the calendar months. The names of the sounds and the Earthly Branches have obvious meanings. Huang-chung and ta-lü are commonly known as the yellow bell and the great bell. The names of the zodiac are those of animals such as the mouse and the ox. However, both series share similar hidden meanings in accordance with the cycle of birth, growth, maturity and dormancy.[36]

The movement of Yang and Yin in a year is divided into halves by the winter and summer solstices. Beginning from the winter solstice, in the first half of the year, Yang waxes and Yin wanes. With the summer solstice as the turning point, the situation is reversed in the latter half of the year. But its equivalence is not readily seen in the order of the twelve sounds in the chromatic series. First, the tonal series progresses by Yang and Yin elements alternately throughout the year without changing its order at the midpoint. Secondly, the pitches progress from low to high constantly without a shift at the middle.

The first discrepancy is corrected by accident. On account of the shift of the generation order at the seventh sound of the generation series, caused by octave transposition, the ideal order of generation which should coincide with the gender of the months is broken. And, as pointed out by Kibi no Mabi, the first seven sounds (eleventh to fifth month) become Yang by the nature of their generation, and the rest (sixth to tenth month), all Yin. This approximately corresponds to the Yang and Yin flow between solstices, since the summer solstice is at the latter part of the fifth month.[37]

The second discrepancy is solved by Huai-nan-tzŭ. He divides the year into twenty-four sections of fifteen days. And to each section, a sound from the chromatic series is applied, each sound appearing

36. These meanings are given in Ssŭ-ma Ch'ien and Po hu t'ung.
37. Cf. Figure 1.

Seasons	Calendar months	Sections	Sounds	Western equivalents	Months ascribed to pitches
Winter	11	1	huang-chung	d	11
	11	2	yin-chung	c♯	10
	12	3	wu-yi	c	9
	12	4	nan-lü	b	8
Spring	1	5	yi-tse	a♯	7
	1	6	lin-chung	a	6
	2	7	jui-pin	g♯	5
	2	8	chung-lü	g	4
	3	9	ku-hsien	f♯	3
	3	10	chia-chung	f	2
Summer	4	11	t'ai-ts'ou	e	1
	4	12	ta-lü	d♯	12
	5	13	huang-chung	d	11
	5	14	ta-lü	d♯	12
	6	15	t'ai-ts'ou	e	1
	6	16	chia-chung	f	2
Autumn	7	17	ku-hsien	f♯	3
	7	18	chung-lü	g	4
	8	19	jui-pin	g♯	5
	8	20	lin-chung	a	6
	9	21	yi-tse	a♯	7
	9	22	nan-lü	b	8
Winter	10	23	wu-yi	c	9
	10	24	ying-chung	c♯	10

Figure 17

Figure 18

then twice. Beginning from the winter solstice, the eleventh month, the tonal series proceeds in reverse order up to the summer solstice where the fundamental sound recurs, making it the turning point. The series then proceeds in normal order until the winter solstice is reached. In this way, the pitches have two curves in a year, a downward progression in the first half, an upward progression in the latter half, comparable to the wax and wane of Yang and Yin (Figure 17).

The division of the year into five seasons, or rather, four seasons plus an elaborately contrived and artificially calculated fifth season, called the center, makes the correlation of the calendar and the Five Elements possible. Each of the four seasons primarily consists of ninety days, divided into three parts: early, middle and late. But in order to construct the fifth season, eighteen days are taken out of each season and referred to as the center of each season. Five seasons of seventy-two days each result. Incidentally, the number seventy-two corresponds to the third tone of the generation series, which came to some importance in the Former Han period,[38] being ascribed to Man, the third of the trilogy — Heaven, Earth, and Man. In reality, seasons cannot be made short to make room for an abstract fifth season. Therefore eighteen days simply ascribed to this artificial season are included in each of the four seasons. Which eighteen days is not specifically indicated. Since summer is the center of the year, its center represents all other centers or eighteen day periods drawn from other seasons. In "Yüeh-ling" this center season is placed arbitrarily between late summer and early autumn; and in Huai-nan-tzŭ, in place of late summer. In associating the pitches with the seasons, the fundamental tone of the chromatic series ought to come under the center. In "Yüeh-ling" this idea is carried out. But it results in the interruption of the flow of the tonal series by the insertion of the fundamental tone at its midpoint (Figure 19).

Seasons	spring	summer	center	autumn	winter
Months	1 2 3	4 5 6		7 8 9	10 11 12
Tonal series	e f f#	g g# a	d	a# b c	c# d d#

Figure 19

In Huai-nan-tzŭ, the tonal series remains uninterrupted. But the tone belonging to the center is not the fundamental tone (Figure 20).

Seasons	spring	summer	center	autumn	winter
Months	1 2 3	4 5	6	7 8 9	10 11 12
Tonal series	e f f#	g g#	a	a# b c	c# d d#

Figure 20

38. Cf. page 159.

What they really mean to say can be expressed only in a circular diagram, the form always used in describing musical phenomena (Figure 18).

Calendrical thinking is thus inevitably related to directional thinking. The winter months are situated in the north; the spring months, in the east; the summer months, in the south; and the autumn months, in the west. Consequently, their counterparts, the twelve sounds and the Twelve Earthly Branches assume directional implications, the twelve sounds, however, to a lesser degree. In the chamber of the standard pitch pipes of Han, described by Kibi no Mabi, the pitch pipes are placed in their corresponding directions, forming a circle, in order to be resonant to their particular calendrical times. Thus immediately related to the seasons and directions, the tonal series, the months and the Earthly Branches come into correlation with the scheme of the Five Elements.

Divination

The invention of the eight trigrams, a system of divination, is ascribed to Fu Hsi, a mythological emperor. By the eight trigrams is meant eight different combinations of undivided and divided lines in groups of three.[39] The undivided line stands for Yang, and the divided line, Yin. The trigrams assume the numerical symbols of the aforementioned Lo shu[40], which afford eight different combinations of numbers, vertically, horizontally and diagonally, all adding up to fifteen. They soon developed into the sixty-four hexagrams, or sixty-four different combinations of the lines in two sets of eight trigrams. Primarily for purposes of fortune-telling, ethical significance was introduced into the system by Confucius who compiled it in I ching, the Book of Changes. It was primarily an independent current from the doctrines of the Five Elements and of Yin-yang. It was in the Former Han period (206 B. C. - 24 A. D.) that it was combined with the doctrine of Yin-yang. And through this doctrine, it found its way into music theory.

The basic number of the system is two. Out of the Great Source, the two aspects are born, and from them, the four phenomena, which generate all else by a process of continued binary creation. By the two aspects, Yang and Yin are meant; and by the four phenomena, the winter and summer solstices and the spring and autumn equinoxes. It is noted that the generation of all things is from four instead of three as by the Yin-yang doctrine. The first two aspects temporarily assume the character of the Great Source and each generates its two aspects (the four phenomena), which in turn assume each the character of the Great Source and generate each two further aspects. The series proceeds by multiples of two: 2, 4, 8, 16, 32, 64. Thus a pair, two aspects out of a source, becomes the most important unit of the divination system. This is analogous to the pairing of Yang and Yin in the generation series.

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39. Such as ☲ ☵ ☳ ☶.

40. Cf. Figure 11.

The "Treatise on the Pitch-pipes and Calendar" in the History of the Former Han Dynasty shows the application of twelve of the sixty-four hexagrams to the tones of the generation series, and through them, to the months. Taking from this treatise, Kibi no Mabi expresses the procedure as a series of marriages of Yang and Yin. The six generations of Yang and Yin coupled together with their divinatory terms and hexagrams are shown on page 174. Instead of the words Yang and Yin, the numbers of the fundamental Yang and Yin sounds, nine and six respectively, are substituted for them. These numbers represent old Yang and old Yin according to the divinatory interpretation.[41] The reverse statement is also possible. At the time of the correlation of music and the art of divination, acoustical theory took over the numbers of the fundamental Yang and Yin in divination, which are the divisions by nine of eighty-one and fifty-four, used prior to this period. The use of such small numbers as nine and six for the bases of calculation, however, results in a series of fractional numbers after the first three sounds. Presumably they are theoretical numbers applied to already calculated pitches. The significance of the correlation of the generation series and the series of twelve hexagrams lies in the classification of the generations in order of derivation out of the fundamental pair of sounds.

The divination system, though essentially based on the number two, is easily related to the Five Elements. The Great Source, which is expressed by a circle, stands for the center. The four primary hexagrams — chen, li, tui and k'an — share the numerical, seasonal and directional symbols with the Five Elements (Figure 21).

wood	fire	earth	metal	water
8	7	5	9	6
chen ䷲	li ䷝	○	tui ䷹	k'an ䷜
spring	summer	center	autumn	winter
east	south	center	west	north

Figure 21

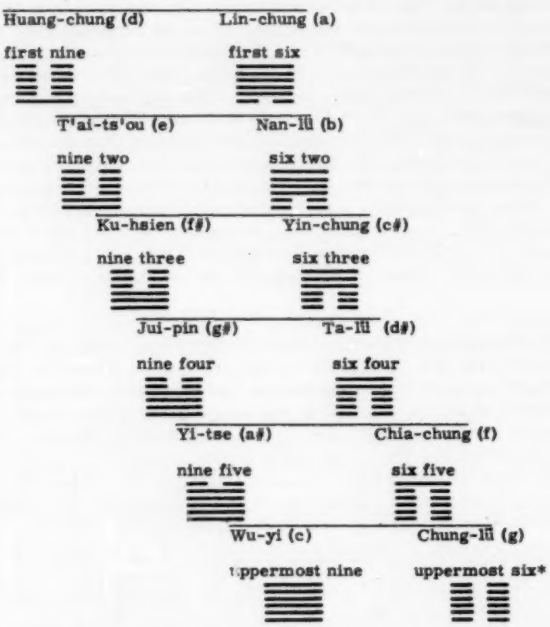
The eight trigrams in relation to the eight directions, and the sixty-four hexagrams in relation to the twenty-four divisions of the year[42] (three sections to each of the eight directions); the twelve hexagrams combined with the twelve sounds and the twelve months; all are ar-

41. Cf. Table I and page 161.

42. Two hexagrams to each of the eight primary sections (the winter and summer solstices, the spring and autumn equinoxes and the four beginnings of the seasons), and three hexagrams to each of the remaining sections.

Table III

The Six Generations of Yang and Yin



*The hexagrams are counted from the bottom up. First nine means the lowest line is Yang; six two means the lowest two lines are Yin. For examples nine three would mean that there would be three yang lines as the three lowest lines, then a yin line and finally two additional lines for which no specific gender is indicated. In other words the unspecified lines show various stages within the category of the designated gender and structure:

Table IV

The Five Elements	wood			fire			center	metal			water		
The numbers	8			7			5	9			6		
The "Five Voices"	chio			chih			kung	shang			yü		
The Ten Heavenly Stems*	a a'			b b'			c c'	d d'			e e'		
The seasons	spring			summer			center	autumn			winter		
The directions	east			south			center	west			north		
The four principal hexagrams	chen			li			☋	tui			k'an		
The eight trigrams	chen	sun		li	k'un		☋	tui	ch'ien		k'an	kên	
The sixty-four hexagrams	8 plus 8 in east			8 plus 8 in south			☋	8 plus 8 in west			8 plus 8 in north		
The twelve sounds	t'ai-ts'ou (e)	chia-chung (f)	ku-hsien (f♯)	chung-lü (g)	jui-pin (g♯)	lin-chung (a)	(huang-chung) (d)	yi-tse (a♯)	nan-lü (b)	wu-yi (c)	ying-chung (c♯)	huang-chung (d)	ta-lü (d♯)
The twelve hexagrams	nine-two	six-five	nine-three	uppermost six	nine-four	first six	(first-nine)	nine-five	six-two	uppermost nine	six-three	first nine	six-four
The Twelve Earthly Branches**	3	4	5	6	7	8		9	10	11	12	1	2
The months	1	2	3	4	5	6		7	8	9	10	11	12
The twenty-eight constellations	7 in the eastern sky			7 in the southern sky			North Star	7 in the western sky			7 in the northern sky		

* For convenience, the Chinese names are replaced by letters of the alphabet.
** For convenience, the Chinese names are replaced by numbers.

ranged under the cycle of the Five Elements.[43]

Summary of Symbolisms

Finally, all the symbols, with the Five Elements at the center, form the full cycle of the Universe: all in some way related to each other through numbers (Table IV). The twenty-eight constellations, which have not been taken up, come under the scheme in association with the calendar and divinations. In this way, they too come into relationship with music. The full cycle in its temporal aspect is one year. By virtue of the year being three hundred and sixty days, the correlation of all symbolic cycles is possible. Although they mention a year of three hundred sixty-five and a quarter days, both Huai-nan-tzŭ and Ssŭ-ma Ch'ien constantly use the year of three hundred and sixty days which is the common denominator of the numbers five, eight and twelve, the most important symbolic numbers. The following passage, taken from the chapter on astrology in Huai-nan-tzŭ, eloquently establishes this: "one pitch generates the 'Five Voices' and the Twelve Sounds. Five times six equals sixty [modes]. Sixty times six equals three hundred and sixty days.[44] ... the cycle of the Five Elements is forty-five days. [The Element is born at the first star,[45] matures at the fifth star, and dies at the ninth star. 5 x 9 = 45]. Eight revolutions of the Five Elements complete the year of three hundred and sixty days."

* * * * * * * * * * *

Symbolisms in ancient Chinese music theory are primarily of numerical nature. They are inextricably related to the symbolisms of the two principal philosophical systems of the time: the Yin-yang doctrine and the doctrine of the Five Elements. The association with the former is manifest in the generation of the twelve sounds; with the latter, in the organization of the "Five Voices" or the basic scale.

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43. No coincidence occurs between the hexagrams of the cycle of twelve and of sixty-four, except for the initial hexagram. The series of twelve hexagrams, derived from the theoretical and not the actual generation series, shows an uninterrupted alternation of Yang and Yin by successive hexagrams. Hence it is in accordance with the gender arrangement of the months and of the chromatic series. The series of sixty-four hexagrams assigned to the twenty-four divisions of the year, shows with them the semi-annual alternation of Yang and Yin. In other words, the first thirty-two hexagrams are all Yang and the last thirty-two, all Yin. The gender contradiction of the hexagrams of the series of twelve and sixty-four is analogous to that of the sounds of the actual generation series and of the theoretical generation series, hence of the chromatic series. Cf. Figures 1 and 2.

44. No explanation is given as to the multiplication by six. Probably six revolutions of the sixty modes.

45. The zodiac.

Pitch calculations are made according to the ratio 3:2 (and its octave transposition 3:4); the numbers three and two corresponding to those of Yang and Yin. Since no intervallic names are known, except for the counting of intervals by the months, such as, the "adjacent month" for the minor second, the "next adjacent month" for the major second, and the "fourth month" for the minor third, this interval, the perfect fifth, having a broad and powerful symbolic significance, comes to great prominence. With the later addition of the symbolisms of divination, the idea of the coupling of the tones at the fifth is still more emphasized. The preeminence of the perfect fifth overshadows all other intervals. When "harmony" is spoken of, it simply means the relationship of tones in the ratio 3:2. And the generation series by fifths loses no importance even after the pitches are arranged into a chromatic series.

The symbolic numbers which the "Five Voices" have in common with the Five Elements signify the hierarchical order of the tones. Five, the central number used for the fundamental tone of the scale, represents the Universe, consisting of the numbers of Heaven and Earth (3 + 2).

The "Five Voices" and the chromatic series represent the cyclic infinity of the Universe through association with the symbolisms of the Five Elements and of the twelve months respectively. The generation series represents this universal cycle not only symbolically but also in actual calculation, in that the last tone of the series produces the fundamental sound by superior generation.

Ultimately, the numbers three and two constitute the basis of music theory, both symbolically and actually, of ancient China, and essentially, of the Far East of today, wherever tradition is preserved.

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A STYLISTIC APPROACH TO SPECIES COUNTERPOINT

by

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Contrapuntal writing with respect to the polyphonic practice of the 16th century has received considerable attention over the last four decades. The investigations of Professors R. O. Morris, Knud Jeppesen, Arthur Tillman Merritt and Gustave Soderland, to mention a few, and the teaching methods which they have provided are known to every instructor of modal counterpoint. The species method established by Johann Joseph Fux in his famous Gradus ad Parnassum (1725), having enjoyed a long and brilliant career despite the lofty position harmony attained in Kompositionslehren, has gradually suffered a decline. Fux recognized Palestrina's stature. To be a contrapuntalist like Palestrina was the goal to be attained. It has been found, however, that Fux did not explain, (nor perhaps did he ever intend to!), the Palestrina style as such. Yet it cannot be denied that many of his students in two hundred years have been, like Palestrina, fine makers of counterpoint. Now, instructors searching for a more general approach to contrapuntal writing have turned to Hindemith's Exercises in Two-Part Writing, while those whose specific desire it has been to explain the style of the "Golden Age" have turned to the style itself.

> With the upsurge of interest in counterpoint as a method of composition in the 20th century, there have been attempts to go back beyond both the Bach type of harmonic counterpoint and the species and to base the study on the results of careful analysis of music of the great polyphonic era of the late 16th century, or in some cases even earlier.[1]

Those who have based their teaching of modal counterpoint on the results of careful stylistic analysis of late Renaissance music warn against beginning with chords. Attention, they advise, should be focused on the linear element — melody — for chords result only from the happy coincidence of melodies sounding simultaneously. Freedom from the controls which harmony has imposed upon melody in more recent times is necessary if this melodic style is to be understood and simulated. Yet the information provided to insure a melodic approach is frequently vague or, perhaps necessarily, incomplete. For the nature of melody in any style is problematical. The rare commingling of intellectual, cultural and psychological factors which contribute to the composer's intuitive genius for producing melody is little understood. Melody's alliance with that relatively unknown quantity, rhythm, increases the mystery. Perhaps it is due to an inadequate symbolic vocabulary which

1. Merritt, Arthur Tillman, "Counterpoint," Harvard Dictionary of Music, p. 192.

keeps theorists from a real theory of melody; perhaps it is only now, in ours and subsequent times, that a theory of rhythm which can explain the nature of form and, thence, melody, will begin to be written.

Our understanding of renaissance melodic style remains empirical; we must rely on description and experience gained from performance. Primary sources, by and large, are disappointing, although their ultimate value is extreme. Treatises on melody exist, but they are primarily devoted to the art of singing. These manuals are concerned foremost with the singers' precious domain, improvisation — the art of "enlivening the counterpoint." Their clues regarding the disposition of florid figures are, of course, invaluable. As for the treatises on counterpoint, they, like their modern counterparts, deal almost exclusively with harmonic practice, problems of mode, cadence patterns and the like, and restrict discussion of melodic structure to details of voice-leading and vague suggestions about, literally, the rise and fall of the line. The student in the 16th century, having melody everywhere about him, undoubtedly encountered fewer ambiguities during his instruction than we, so far removed, do today. Our observations are at best speculative. Yet it remains that if this style is truly primarily melodic, so through melody it must be approached. Any other approach is, at best, made through the back door. A realization of the supremacy of melody and the underlying rhythmic flow which is responsible for its grace and subtle, tantalizing undulation is imperative.

The remarks on melody which follow are directed to this end. The exercises which culminate this discussion are designed to help the student retain a full awareness of the freely flowing rhythmic independence of melody while the problems of harmony are being solved. Through writing and accurate performing of such exercises, and through further creative efforts, the student may consciously, not accidentally, embrace the style and come to know the meaning of counterpoint.

Rhythmic Aspects of the Melodic Style

> Sixteenth-century music is as outstanding on account of the elasticity and diversity of its rhythms as it is on account of its singable intervals. The ease and grace with which it moves rhythmically are astonishing to one who knows only eighteenth-and nineteenth-century music ...This freedom... lies not only in the rhythm of the ensemble but also in the rhythmic diversity that the various individual voices have in contrast with each other.[2]

What is meant by rhythmic diversity or freely flowing melodic rhythm? Of the many factors which contribute to melodic flow, the forces of rhythm are probably paramount. The exact nature of such

2. Merritt, Arthur Tillman, Sixteenth-Century Polyphony: A basis for the study of counterpoint, p. 35.

forces remains, as was suggested previously, unclear. It is recognized, however, that movement through time is achieved in large part by the succession of simple rhythmic units which may be likened to units of energy. The construction of a simple rhythmic unit may be one of only two possibilities, either binary or ternary, i.e., the unit may be composed of two or three pulses. Furthermore, only one pulse in a rhythmic unit may be considered dominant or, if you will, accented.

A large portion of late renaissance music is notated under those conditions imposed by the symbol ¢, tempus imperfectum diminutum cum prolatione minore, and under this sign the basic pulse, in most cases, is the minim represented in all but one case here as a half-note.[3] The simple rhythmic unit in this style is the organization of two or three of these basic pulses. Without recourse to prosodic analogies it may be seen that the curious flow of renaissance melody is due primarily to the peculiar disposition of rhythmic units. Unobliged to establish a pattern of sameness, or ally itself with meter, binary and ternary units may succeed each other in any order to produce the free rhythmic quality of this style.

It is necessary to bear in mind, when speaking of the accented pulse of the rhythmic unit, that accent here carries with it no implication of dynamic stress. There is no evidence in the music or documents of the time to indicate that the dynamic accent was part of the composers' or performers' vocabulary. How, then, is the rhythmic order clarified? What are the aural qualities which give melody its rhythmic flow?

The accented pulse of a binary or ternary rhythmic unit is most often clarified by some kind of non-dynamic stress, audible or imagined. A stress may be achieved by one particular means, or by the interaction of several.

Perhaps the most frequently cited method for achieving stress is the so-called agogic accent.[4]

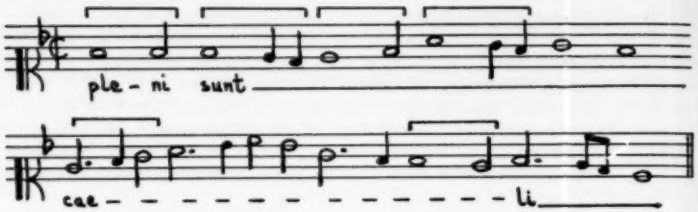
> So strongly, indeed, is the force of the "agogic" accent felt that it may almost be said to carry its own stress with it, making the listener imagine it has been so reinforced by stress, when as a matter of fact it has not been so reinforced [i.e., dynamically] ... a note which is either preceeded or followed (and still more

3. In conformity with 16th-century practice, this basic pulse will proceed at a tempo of 120-144 M.M. per minute. Gafurius, in his Practica musicae (1496) states that the length of the semibreve may be equated with the normal human pulse-beat. There is some evidence which suggests that, as one progresses further into the 16th century, the duration of the semibreve increases.

4. The term agogic or agogik is of recent origin having appeared for the first time in H. Riemann's Musikalische Dynamik und Agogik (1887).

strongly, one that is both preceeded and followed) by notes of smaller value than itself tends to have the force of an accent.[5]

This accent, achieved by length or duration, is unmistakable. The temporary cessation of movement provides a stress which is usually strong enough to clarify the rhythm (Example 1). It is convenient to

Example 1[6]

refer to the accented pulse as the first pulse in the rhythmic unit and to bracket the ternary units, thereby aiding the inexperienced performer or student in the recognition of the rhythmic units. This is not designed to contradict the various rhythmic patterns of prosody, but only to clarify the position of stressed pulses.

The establishment of rhythmic flow frequently results from the placement of accented syllables of the text. In the motets and madrigals of the late 16th century the rhythm of melody and text are closely allied.[7] The combined operation of stressed text syllables and agogic accents clarifies the free rhythmic flow even more exactly. The cantus of Thomas Morley's Canzonet for three voices, "Where Art Thou Wanton," serves to demonstrate this (Example 2). A mixture of binary and ternary rhythmic units is realized through the grouping of stressed and non-stressed pulses. Stress is provided by the notes of longer duration, i.e., semibreves and dotted minims, and by the rhythm of the text.[8] Quite rightly no rhythmic pattern is discernable until the fourth note since rhythm will not develop until the pulse is established.

5. Morris, R.O., Contrapuntal Technique in the Sixteenth Century, p. 22.

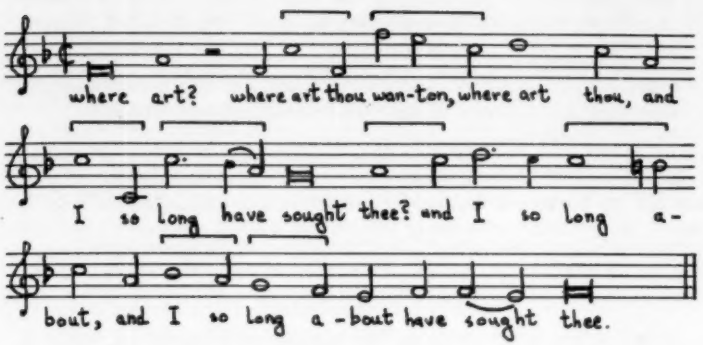
6. Isaac, Heinrich, Missa Carminum.

7. See Zarlino, Gioseffo, Istitutioni harmoniche, Book IV, trans. in part by Oliver Strunk in Source Readings in Music History, p. 253 ff; Fellerer, K.G., Die Deklamations - Rhythmik in der Vokalen Polyphonie des 16. Jahrhunderts; the editions of English Madrigals by Edmund H. Fellows; Scott, Ch. Kennedy, Madrigal Singing.

8. Reliance on text placement can, however, be dangerous. The coincidence of rhythmic accent in text with musical rhythm is common only in styles after 1540. In plainsong, for example, the relationships are quite different. In the music of earlier renaissance composers, too, a close tie between text and music, in this sense, is rare. The influences of extra-musical doctrines had not yet been felt.

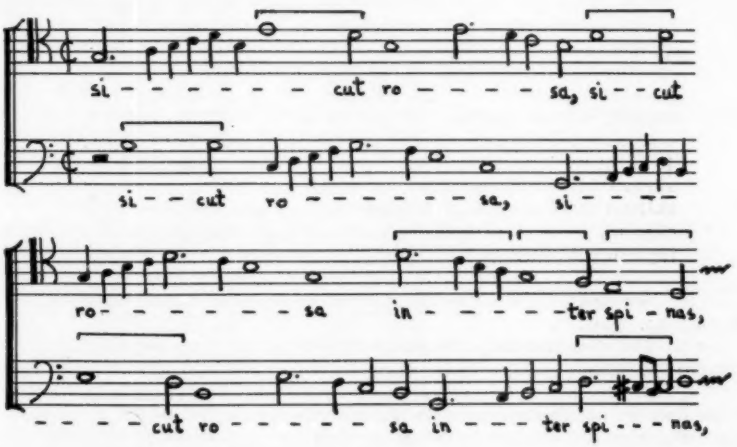
Example 2 demonstrates still another way in which stress is

Example 2


where art? where art thou wan-ton, where art thou, and
I so long have sought thee? and I so long a-
bout, and I so long a-bout have sought thee.

achieved. Through melodic shape, particularly through the accent stressed by leaps, further support of agogic stress is made to define the rhythm even more clearly.

A performance of Example 3, the opening section of Lassus' Sicut Rosa, sung with careful regard for the rhythmic organization of each voice, will demonstrate the vigorous counterpoint which results from the free rhythmic flow of melodies sounding together.

Example 3

A full appreciation of the implications of free rhythmic flow is not as easily realized and enjoyed as one would hope, for certain "tradi-

tional" concepts, some of which may even be considered basic hypotheses, are frequently so imposed upon this melodic style that the vitality of rhythmic diversity is clouded or even lost. The admonition "not to begin with chords" in approaching the 16th-century style is clearly made to relieve melody of unnecessary harmonic burdens and concentrate attention on the linear elements. Some success has been achieved. Yet, the removal of harmony to a slightly more subordinate position hardly sets things aright. Probably no single force may inhibit melodic flow more than an emphasis on the "traditional" role of meter.

It would seem, in the examples above, that the time signature has been completely disregarded. The usual questions arise: How is it possible to disregard the accents which meter imposes? Is not the symbol ¢ an indication of a basic meter, for does it not imply 4/2 time with a primary and secondary accent falling on beats one and three respectively, while beats two and four remain relatively unaccented? Unhappily, this is not entirely the case.

In white mensural notation, the system of notation employed in the 15th and 16th centuries, symbols such as this one indicate that written notes will receive particular temporal values. In other words, a mensuration sign informs the performer that certain specific rules for determining note duration are to be followed.[9]

Speaking of the sign ¢, Professor Van den Borren writes:

> It is, after all, an empirical way of informing interpreters, so they may be guided, of the value of the notes, and nothing but that, after the proper rules according to tempus imperfectum, prolatio minor. As these rules are much simpler than those which govern tempus perfectum, prolatio minor, represented by O or Ⓞ, it is not surprising that ¢ was, in the final analysis, preferred to those two latter signatures for use as a general indicator for interpreters. This is surely, it seems, the reason for its almost exclusive use beginning with the second third of the 16th century, the O, the Ⓞ or other analogous signs being more ordinarily reserved for brief passages in which one hears, by the skillful intervention of a more or less precise ternary rhythm, a contrast with the more or less indeterminate rhythm represented by ¢.[10]

9. See Apel, Willi, The Notation of Polyphonic Music 900-1600, 4th ed., pp. 96ff.

10. Van den Borren, Charles, Études sur le Quinzième Siècle Musical, p. 129.

C'est, en somme, un moyen empirique d'indiquer aux interprètes qu'ils doivent se guider, pour la valeur des notes, et rien que pour cela, d'après les règles propres au tempus imperfectum, prolatio minor. Comme ces règles sont beaucoup plus simples que celles qui gouvernent le tempus perfectum, prolatio minor, représenté par un O ou un O barré, il n'est pas surprenant que le C barré ait été, en fin de

For some, the establishment of a meter as the regular recurrence of accented or unaccented beats is thought to be accomplished by the tactus. Throughout most of the 16th century the tactus unit was the semibreve, which, as we have seen, proceeded at the human pulse-rate. The tactus is formed of two parts, a thesis and an arsis, which names are applied to the two minims of the semibreve in ¢, the first being thetic and the second being arsic. Likening the words thesis and arsis to downbeat and upbeat, respectively, is irresistable. Yet, regretably, the idea of the thesis being accented and the arsis being unaccented is not implicit in the term tactus. The thesis and the arsis are merely pulses which receive their names from the motion of the choirmaster's arm as he provides the beat which will hold all voices of the concento together.

Assuredly, a rhythm may frequently be established which coincides with the tactus. Yet again, Example 1 demonstrates that the tactus is providing only the basic pulse which is the minim; a coincident rhythmic organization seldom exists.

The implications attached to meter in those styles which come after 1600 cannot be successfully imposed upon the renaissance style. It is with the rise of functional harmony and the necessary vertical organization of texture which accompanied it along with the increasing importance of dance music and the development of a primarily homophonic style, that meter as the regular recurrence of strong and weak beats is felt. But to cause a conscious accent to fall on every other pulse in a renaissance melody would deny the melodic line its own rhythmic independence. At all costs it is necessary to be free of meter as a persistent underlying motor pattern under which all flow becomes subsumed. Although the harmonic flow may be allied with meter, the articulation of rhythmic order is not coincident with the metric order.

Meter, in the 16th century, means measure, i.e., meter is a measure of duration. This measurement is made not by the regular recurrence of accents, but rather the measurement is made in terms of time units. To regard the mensuration sign ¢ as representing 4/2 time may not be inappropriate provided it is understood only as a measure of duration — the length of tones in time.

What becomes, then, of the syncopation? Without a strong metrical beat, does it not lose its meaning, since we tend to regard the syncopation as a misplacement of the metric beat employed to disturb the dominant metric flow? Many examples from the literature of the period can be found which would seem to support this definition. In

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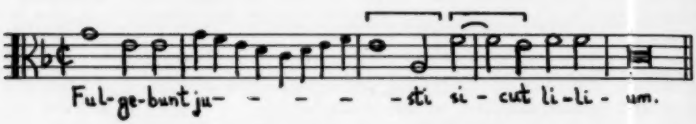
compte, préféré à ces deux derniers signes pour servir d'indicateur général aux interprètes. C'est bien là, semble-t-il, la raison pour laquelle on n'utilise plus guère que le C barré à partir du deuxième tiers du XVI^{e} siècle, le O, le O barré ou d'autres signes analogues étant le plus ordinairement réservés à de brefs passages, dans lesquels on entend ménager, par l'intervention d'un rythme ternaire plus ou moins précis, un contraste avec le rythme plus ou moins indéterminé représenté par le C barré.

Example 4, the opening phrase of a Lassus bicinia, a syncope seems clearly evident. Yet it remains that in such a style as this one, a syn-

Example 4



cope which depends upon a strong beat for definition is lacking, for the idea of a consistent rhythm is foreign to this style.

Professor Van den Borren, discussing the development of the renaissance style from that of the preceeding Ars Nova, expresses himself quite clearly on this matter:

> ...the further evolution proceeded clearly in the direction of a progressive breakdown of the rhythmic regularity, by means of contrivances which exhibit the appearance of syncopes in modern transcriptions. These syncopes, or, more exactly, these pseudo-syncopes — because they have not in any way the effect of hindering the rhythm and causing that which we call today the syncopation — these pseudo-syncopes encounter, in the barline, a factitious obstacle, which it is important to pass over by making it a simple abstraction.[11]

The syncopation is a result of the rhythmic flow of melody. An explanation of it in something approaching its own terms is found in the theoretical writings of the 14th century where "syncopation is explained, not as it is today, (such an explanation being impossible since accent or strong beat is a concept foreign to early theory), but as a separation of a normal group of notes by the insertion of larger values."[12]

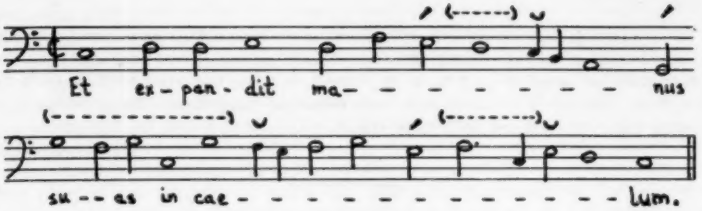
In Example 5 a binary rhythm is clearly established by the introductory semibreves and paired minims. This rhythm may be expected to perpetuate itself. Under such a condition a psychological accent will be felt on the third minim in the word manus only to be followed on the next pulse, the arsis, by another accent of a stronger nature. (Any dynamic bump on the following thesis is, of course, completely outside

11. Ibid., p. 128. ... l'évolution ultérieure s'est nettement poursuivie dans le sens d'une brisure progressive de la régularité rythmique, au moyen d'artifices qui offrent l'apparence de syncopes dans les transcriptions modernes. Ces syncopes ou, plus exactement, ces pseudo-syncopes — car elles n'ont nullement pour effet de retenir le rythme et de provoquer ce que nous appelons aujourd'hui des contretemps — ces pseudo-syncopes re contrent, dans la barre de mesure, un obstacle illégitime, qu'il importe de franchir en en faisant purement et simplement abstraction.

12. Apel, Willi, Harvard Dictionary of Music, p. 727.

of the style.) Two rhythmic accents have occurred without an intervening pulse. This pulse, however, has only been displaced. The two pulses (´ ˘) of a binary unit have been separated by an inserted

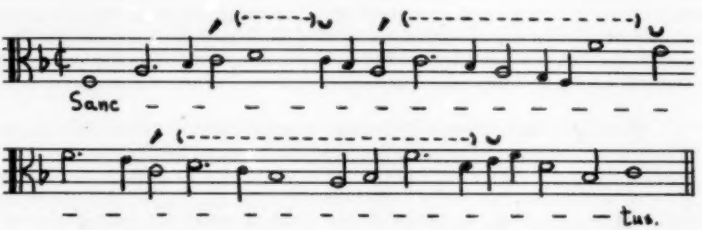
Example 5[13]



binary unit. All is rectified before the next semibreve. Proceeding further another syncope occurs when, again, an unaccented pulse is displaced. The pulse which should follow the one on the syllable -nus of manus is separated from it by the inserted binary groups on the syllables suas in cae-, but the disposition is arighted immediately thereafter. Still another displacement follows.

Example 6 demonstrates even more extensive syncopations:

Example 6[14]



Zarlino's explanation, in no way contradictory to the above explanation, serves as a convenient definition useful in the practical creative work in 16th century counterpoint: A note which begins on the arsis of the tactus and is retained beyond the next pulse, the thesis, may be called a syncope.[15] In other words, a semibreve or dotted minim which begins its sound on the arsis may be said to be syncopated.

The use of the term syncope synonymously with suspension, as some do, is, of course, an error. A syncope lies completely within the realm of rhythm. It has only to do with the rhythmic order as it is

13. Des Pres, Josquin, Stetit autem Saloman.
14. Isaac, Heinrich, Missa Carminum.
15. Zarlino, Gioseffo, Istitutioni harmoniche, Book III, Venice, 1558, p. 209.

related to the basic pulse, the minim. The suspension is an harmonic fact. This dissonance, which must occur on the thesis, is dependent upon an existing syncope, but occurs more infrequently than the syncope. It is primarily relegated to cadence formulae where it participates in the clarification of structure by helping to make harmonic, rhythmic and tonal orders explicit.

The balance of musical factors is indeed difficult to retain in any discussion of style. Emphasis is bound to be given one area at the sacrifice of another. But it is hoped that as the elements of melody, rhythm, meter and harmony are rebound together, their respective roles may be enjoyed with new vigor.

Exercises in Contrapuntal Writing

The various approaches to composition in the 16th-century style seemingly deny melody its rightful place. Despite continuous reference to this style as an essentially melodic one and despite the recognition and altogether too brief exposition of the free rhythmic nature of this melodic style, the harmonic problems invariably smother melodic concepts. While it is true that certain 16th-century theorists concentrated their efforts in explaining the harmonic style, melody being everywhere about them, we can hardly expect our students to have an inherent understanding of this melodic style. If they have a natural melodic utterance at all, it will be founded primarily upon the "bel canto" of more recent times. It seems appropriate to provide work materials which will afford a continuous awareness of melody and help the student develop a skill in the handling of melodic rhythm, rather than propagating a variation of the study of harmony.

The term "species counterpoint" carries with it today certain unfortunate connotations; however, the value of contrapuntal exercises is considerable. For without first pointing the concentration to particular stylistic problems, the free creative work in the style will be for the student discouragingly difficult. The exercises which follow are designed to help the student develop techniques in both melody and harmony. The free rhythmic nature of this melodic style is dealt with concurrently with the harmonic problems to provide skill in both areas. A careful performance of each exercise completed must, of course, follow. The vitality of the resulting counterpoint will be clearly evident.

Exercise Type I

The first exercise is note-against-note counterpoint. Since pedagogy in counterpoint began, no clearer method has been found to explain the basic harmonic material. The cantus-firmus employed comes from the Gregorian repertoire and should be one already familiar to the student.[16]

16. The close similarity between the music of the Renaissance

The note value employed need not conform to the whole-note with which we are familiar. If the student has transcribed the notes of the chant as eighth-notes, it may be practical to use eighth-notes here. It seems more advantageous, however, to choose now the note value which will be, from this point on, the tactus. Therefore, each note may be written as a whole-note or as a half-note. The latter is highly practical if frequent reference to modern performing editions is made. The whole-note serves the present exposition better because of its exact correspondence to the semibreve of the mensural notation system.

The rhythmic flow of Gregorian melodies is important. A study of the rhythm of chant as set forth by the Benedictines of Solesmes is essential if chant is to be used as a pedagogical instrument to demonstrate the free rhythmic flow of renaissance melody.[17] Any haphazard grouping of the rhythmic units or "rubato" approach to the melodic patterns will only reduce the usefulness of chant as an introduction to this style.

When the cantus-firmus is set down it is well to clarify the rhythm by bracketing the ternary units and placing an ictus, or vertical line, under the note which corresponds to the stressed pulse. For example, the Alleluia in Mode IV (Example 7) becomes, when written in whole-notes, the cantus-firmus in Example 8 of note-against-note counterpoint.

Example 7[18]

The student composing a counterpoint above and below the given cantus-firmus will proceed in the customary way, bearing in mind whatever "rules" have been established regarding the progression of

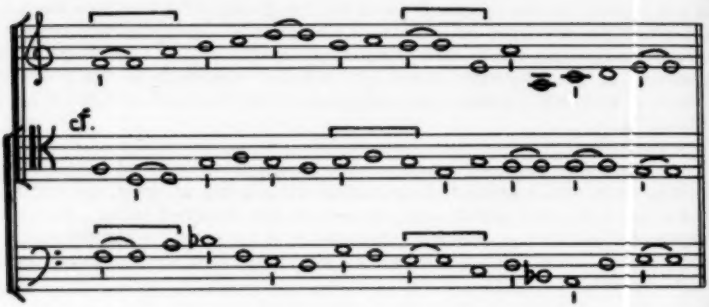
and plainsong has been pointed out frequently. It would be hoped that no one would attempt to explain the 16th-century style without first devoting considerable attention to the style of Gregorian melodies. Twelve full class sessions spent with chant in a normal 39-hour semester is not disproportionate. The study of the modes and the melodic patterns which give each mode its particular individuality, and the analysis of the free rhythmic flow of these melodies, the cadential function and the over-all structure, and the performing of these melodies and the writing of similar ones will give the student a feeling for rhythmic and melodic style which is invaluable. Nothing need be unlearned in approaching any later style, particularly the melodic style of the 16th century and the rhythmic style of the 20th.

17. Liber Usualis, p. xxvi ff. For the theory, see Mocquereau, Dom André, Le Nombre musical grégorian, volume I, part I, trans. by Aileen Tone.

18. For the Solesmes edition of the Gregorian notation, see Liber Usualis (with introduction and rubrics in English), p. 97.

intervals.[19] He should be encouraged, however, to use long-notes (breves) occasionally so he may recognize how notes of longer duration clarify the melodic rhythm. The greatest distance permitted between the voices is a matter for the instructor to decide.

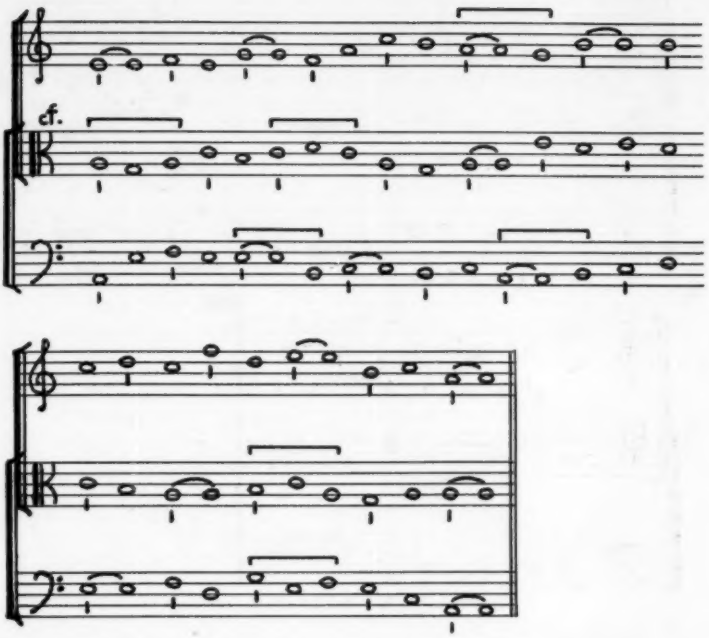
Example 8



The finished melody should be analyzed in order to establish clearly the flow of rhythmic units, remembering that length produces stress and that "groups of one" are impossible. The exercise should be sung first at a slow tempo with attention being paid to intervals and voice-leading, then several times at a moving tempo (𝅝 = 120 M.M.). The effect of the rhythmic counterpoint should be well tasted. It should become as much a part of the student's aesthetic appreciation as the harmonic elements which so unobtrusively bind the melodies together.

When the student has a solid grasp of techniques so far, he may be asked to write counterpoints against longer melodies of more than one phrase (Example 9). In his melodies, internal closes, which may or may not coincide with those of the cantus-firmus, should be created.

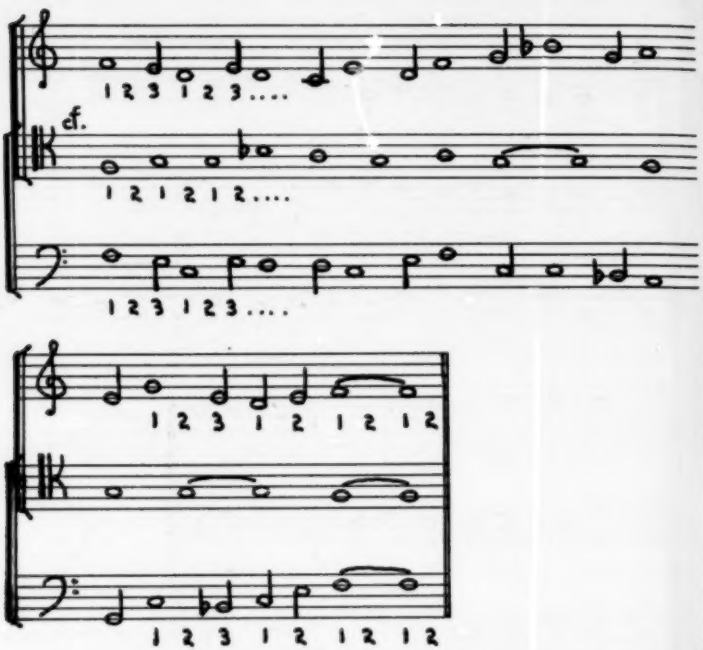
19. Such rules do, indeed, vary according to the primary and secondary sources the instructor chooses to follow.

Example 9[20]

Exercise Type II

The second exercise serves two purposes: (1) it trains the student in the uses of dissonance, and (2) it points up through exaggeration the contrapuntal effect which occurs when one voice moves in ternary rhythm against another in binary rhythm. The minim or half-note is the basic pulse (𝅗𝅥 = 120-144 M.M.).

At first no dissonances may be permitted (Example 10). Attention should be focused entirely on the melodic character of the voice being written against the cantus-firmus. One or two binary units may need to be employed to bring both voices to the final together. If the cantus-firmus permits, the final unison should be preceeded with a minor third or the final octave with a major sixth.

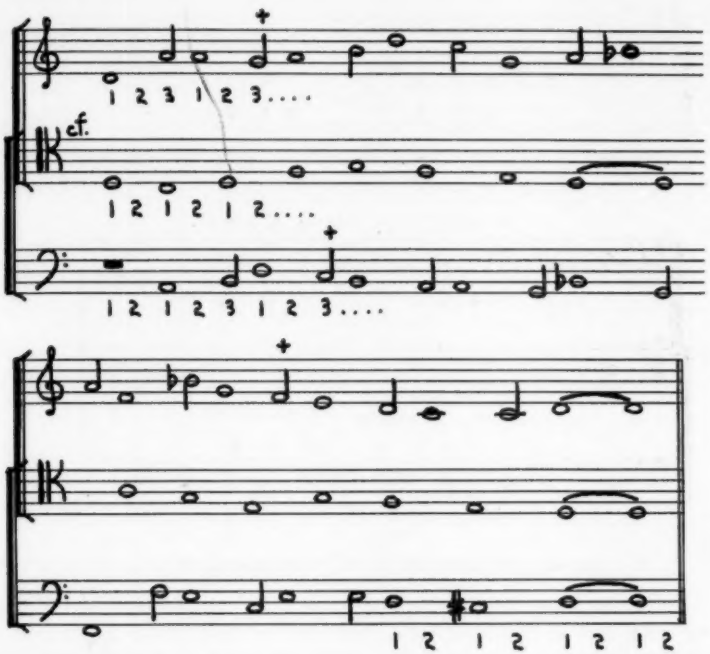
20. Liber Usualis, p. 125. Cantus-firmus is a "Benedicamus Domino" in Mode II.

Example 10[21]

The student who has heard and performed extensively certain contemporary styles may have little trouble performing these exercises. For others and for large sections of concert audiences the rhythmic delights in the music of the 16th and 20th centuries remain mysterious. Truly, it may even be said that the rhythmic delights of renaissance music are far from being mysterious; they are completely absent. It is important, if this style is to be understood and appreciated, that the rhythmic flow be always clear. To achieve this end it becomes necessary, first of all, to refrain from giving any kind of metric accent. The arrangement of consonant and dissonant intervals will provide all the metric order that is necessary. If a clear pulse beat is maintained, the voices will move together properly. Second of all, it will be found that the rhythmic vitality of this style will be additionally clarified when the accented pulse of the rhythmic unit is given the slightest dynamic (!) stress. Further, any unaccented pulse which may fall on the thesis should be treated lightly. Some students find that the rhythmic units will flow more easily if numbers are given to the pulses as shown above. No evidence of dynamic stress is found in the music or in the documents of the period, but for the 20th-century

21. Ibid., p. 97. Cantus-firmus is an Alleluia in Mode VI.

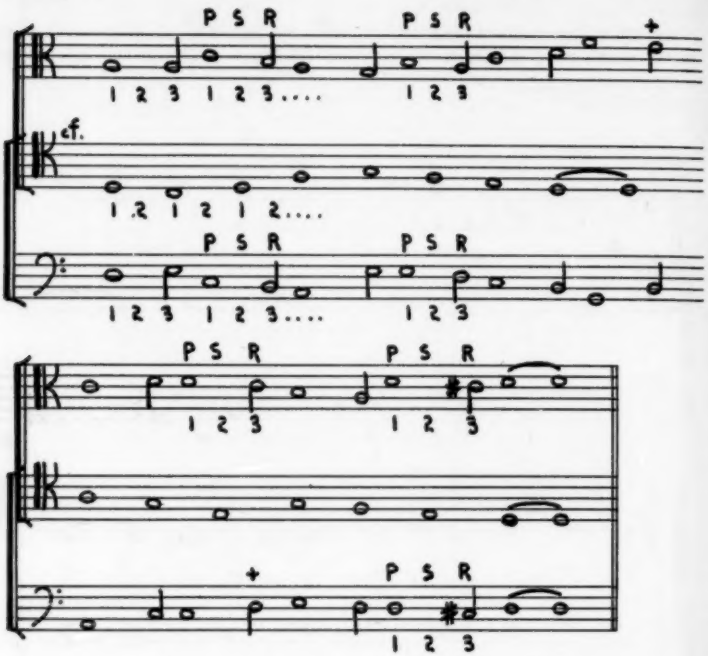
audience such stresses are frequently required; for through them the integrity of the style may still be carefully maintained without sacrificing, in the name of proper performance practice, those things which the modern audience depends on for its understanding and enjoyment of a style.

When the student has developed ease and accuracy in performing these exercises, dissonance may be introduced (Example 11). First

Example 11[22]

he may deal only with such "accidents" as the passing or returning note, and the cambiata. The rule is simple: Never bring one of these dissonances on the accented pulse of the rhythmic unit or against an accented pulse in the other voice. Exceptions to this rule should be withheld until the student is ready to consider certain elaborations of the basic cadence formulae.

22. Liber Usualis, p. 789. The cantus-firmus of this and all subsequent examples is taken from the Easter Sequence "Victimae paschali laudes."

Finally the student is prepared to deal with the suspension dissonance (Example 12). The problem is easy if these conditions are observed:

Example 12

1. The dissonance must occur on the thesis of the cantus-firmus.

2. The rhythm of the voice which will carry the suspension must be such that an accented pulse falls on the preceeding arsis (of the cantus-firmus). Because it is an accented pulse, it must be consonant with the cantus-firmus. This note will be a semibreve (or later, a dotted minim).

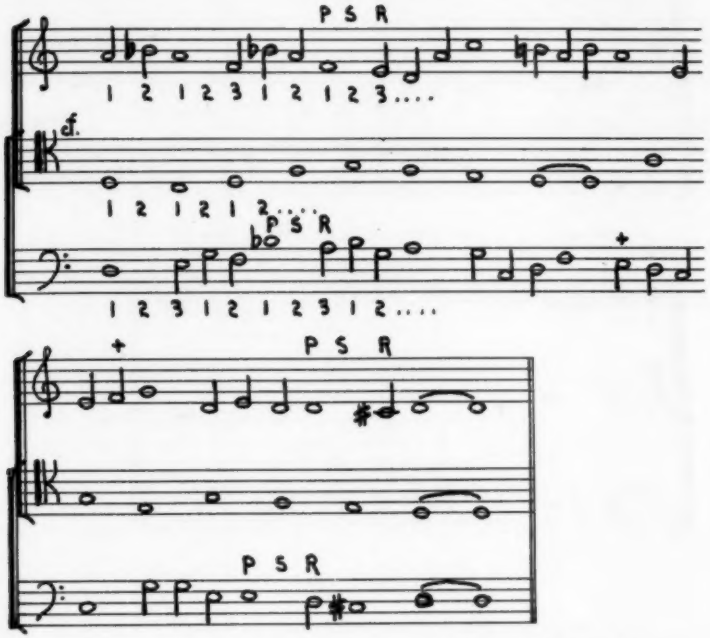
3. The cantus-firmus, of course, must have its accented pulse on the thesis.

4. The suspension must resolve downward a diatonic step.

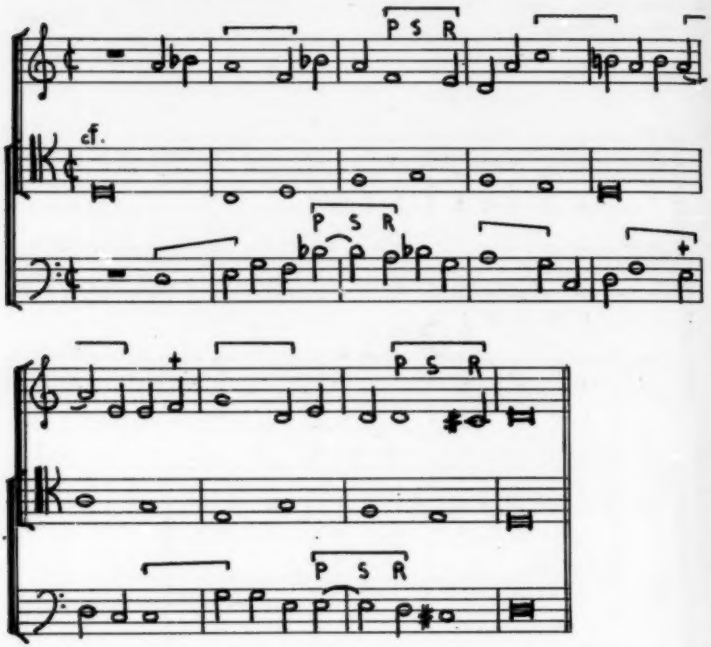
The suspension usually occurs, as in this exercise, within a ternary group. The first pulse is called the preparation (P), the second pulse the suspension (S), and the third pulse (or last half of the second), the resolution (R).

Exercise Type III

The next exercise is characterized by the alternation of binary and ternary units (Example 13). Here the student's attention is on melodic and rhythmic factors primarily while practice with the harmonic style continues. He may need to be warned again not to bring a dissonance, except the suspension, on an accented pulse.

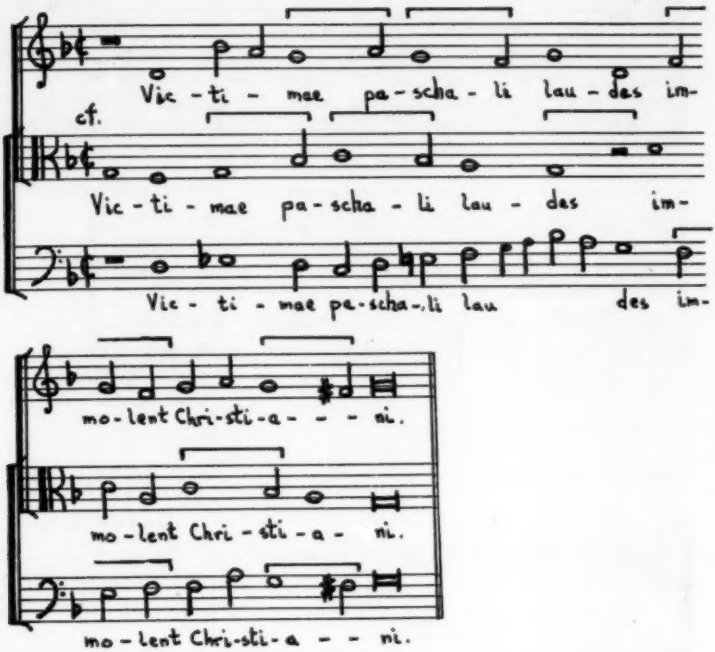
Example 13

If the student has gained a writing and performing proficiency with melodic rhythm, the modern bar-line may be superimposed upon his exercises. He must fully understand its function, however. It is not an indicator of a primary rhythmic organization, but serves only as a notational convenience for the reader when voice parts are placed above one another in score. The use of bar-lines of this type, like the score, is a development of the 17th century. Examples of them in the 16th century are extremely rare, for a performer usually had only his own part before him, unbarred, of course. Anyone who has been obliged to "cut his part," reading from a part-book, can not help recognizing, perhaps quite painfully, the beauty of this freely moving melodic style. The student should be kept from backsliding. Any tendency to replace rhythmic flow with a regular meter should cost him his bar-line.

Adopting the conventional barring system for this music, Example 13 becomes:

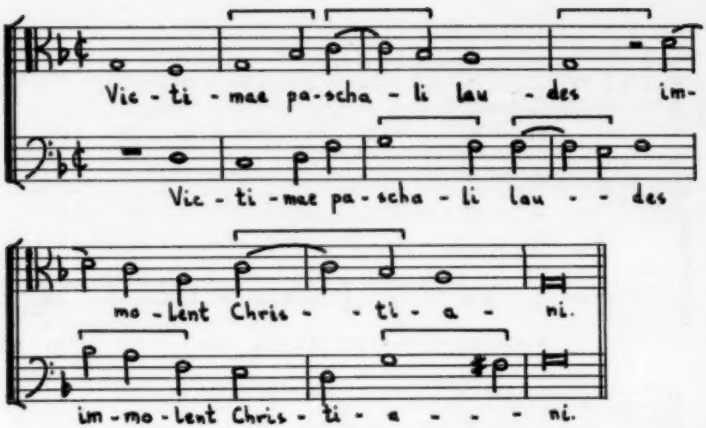
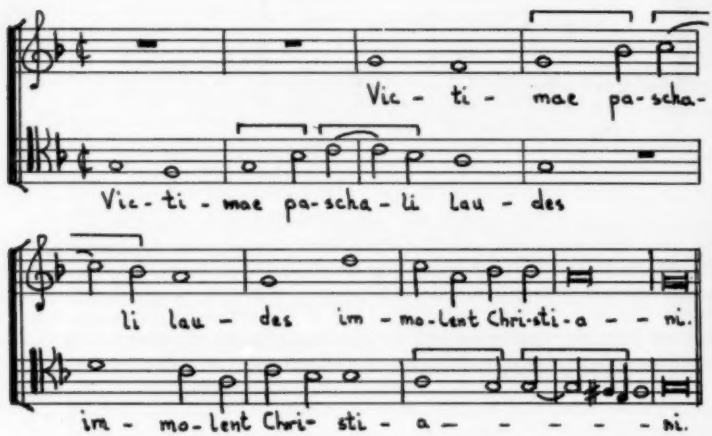
Example 14

Exercise Type IV

It is no longer necessary to proceed in a stylistic vacuum. Example 15 bears no unrealistic elements. Rather, the successful working-out of this exercise will produce a phrase of two-part music resembling hundreds of such biciniae from the literature of the period.

The cantus-firmus may now be drawn from any source. Just as the composers themselves drew upon each other for "subject" matter, taking a phrase here, several bars there, or even entire sections of two-and three-part texture, we may adopt one or two phrases or even entire sections of a 16th-century motet to serve as a tenor for bicinia or tricinia composition. The cantus-firmus or tenor will, therefore, be a freely flowing melody against which the student will compose his own counter-melody.

Example 15

Vic - ti - mae pa - scha - li lau - des im-
cf.
Vic - ti - mae pa - scha - li lau - des im-
Vic - ti - mae pa - scha - li lau des im-
mo - lent Chri - sti - a - - - ni.
mo - lent Chri - sti - a - ni.
mo - lent Chri - sti - a - - ni.

At this time, he may benefit from a discussion of ornament, i. e., the various florid patterns of smaller notes which will eventually become essential to the melodic flow of his future compositions in the style. In addition, he may be ready to consider the problem of text-setting with particular regard for the coincidence of stressed syllables and longer note values, and he may try his hand at imitation (Examples 16 and 17).

Example 16

Example 17

The student should now have a grasp of the basic techniques of the style and the meaning of counterpoint should be quite clear. Through analysis of the music of this period and further creative work he should be able to build significant musical structures in this style.

THEORY FORUM

RE: A REVIEW IN OUR ISSUE OF MARCH 1957.

By Allen Forte

After the publication of Contemporary Tone-Structures in late 1955 it was reviewed several times, notably by Hans Keller in "Music & Letters," by Herbert Livingston in "Notes," and by William Mitchell in "Etude." Quite naturally, each of these reviewers found certain parts of the book commendable and other parts displeasing — but none was so fervently negative in his opinion as is Howard Boatwright in the first issue of the Journal of Music Theory. That Mr. Boatwright's opinion is negative is certainly not cause for controversy. One's opinion is, after all, a private affair, particularly if it remains private. But it is a different matter when, as in this instance, a publicly expressed opinion is based upon informational and logical errors. It is therefore in an effort to correct some of those errors that I am writing this commentary.

I would like to consider first Mr. Boatwright's angry appraisal of the book's relation to the work of Heinrich Schenker. (Indeed, Schenker arouses Mr. Boatwright's ire to such a degree that his review at times seems to be a critique of Schenker's Der Freie Satz.) That there should be so much anger directed against Schenker at this late date is surely cause for concern. Theorists may well ask themselves whether Schenker's work and his position in music theory are properly (by which I mean intelligently) evaluated in this twenty-second year after his death. The seriousness of the situation is well illustrated by Mr. Boatwright's alarmingly candid statement: "I am not a Schenker disciple, and am not qualified to say how well Forte uses this method. But I will venture a few words on its appropriateness in a book of this kind."

However, having thus blithely admitted that his knowledge of Schenker's work is somewhat less than thorough, Mr. Boatwright does more than venture a few words. He attempts to deal in highly specific terms with Schenker's theory per se and with Schenker's theory as it relates to Contemporary Tone-Structures. His efforts only lead him farther and farther astray, beginning with his incorrect estimate of the extent to which Schenker's theory penetrates Contemporary Tone-Structures. He writes: "The preface acknowledges that this study is indebted to Schenker's method of analysis." The preface in fact reads: "I am indebted to the work of the late Heinrich Schenker for the notion of the analytic sketch and for certain terminology." This exact quotation is quite specific and carries a far different meaning than does Mr. Boatwright's very misleading indirect quotation. Probably a more accurate appraisal of Schenker's relation to the book is Hans Keller's remark that Schenker "turns over in his grave in view of Mr. Forte's (highly profitable) adaptation of the concepts of 'foreground,' 'middleground,' and 'background' for the purpose of analysing works which Schenker would not have regarded as music at all." It should be em-

phasized here (as it was in the preface) that the book is indebted to the work of several persons other than Schenker. For example, the writings of Milton Babbitt on twelve-tone technique and on the Bartok string quartets were invaluable sources.

Also misleading is Mr. Boatwright's assertion that "what this book does do by its premature use of Schenker's method is to carry on one of the less fortunate aspects of that approach." The latter part of this statement obviously requires no discussion, since Mr. Boatwright himself has already cast serious doubts on his ability to judge which aspects of Schenker's theory are more or less "fortunate." Instead, attention is directed to the adjective "premature." It will be apparent to those readers familiar with the literature of music theory that neither Contemporary Tone-Structures nor any other book using Schenker's ideas in connection with modern works could possibly be called premature if it was published later than 1952, because two major publications, both admittedly applying Schenker's formulations of structure to modern compositions, appeared before and during that year: Challenge to Musical Tradition, by Adele Katz (Knopf, 1945) and Structural Hearing, by Felix Salzer (Boni, 1952). Is Mr. Boatwright not familiar with these books?

In addition to generating the errors discussed above, Mr. Boatwright's lack of knowledge causes him to make most seriously misleading statements about Schenker's theory. He writes: "His [Schenker's] method served a purpose that the other, more detailed and specific type of analysis could not serve — it brought the analyzer's attention to the larger, more general aspects of tonal and linear movement." This statement suggests that Schenker had no understanding of musical detail and no way of dealing with it — a fallacious notion. Of the 232 pages of Der Freie Satz, 141 are devoted to "foreground," or detail. Mr. Boatwright's statement also implies that there is something vague, nonspecific about Schenker's theory. Undoubtedly there is — but only in Mr. Boatwright's mind.

It should be pointed out, in Mr. Boatwright's behalf, that he is not alone in his confusion regarding Schenker's work. Many theorists, particularly in this country, share his inadequacy. The lack of an English language version of Der Freie Satz, Schenker's last and most important book, appears to be largely responsible for the widespread ignorance concerning his theory as well as for the many uninformed comments upon it which continue to appear in print. Even recent nontechnical or quasi-technical books, such as Leonard Meyer's Meaning and Emotion in Music, deal with Schenker's ideas not directly but in terms of what others have written about them — and thus many misconceptions are being perpetuated.

Schenker's position in music theory is altogether paradoxical. On the one hand he is disliked intensely, and yet his work has had tremendous influence. There is hardly a significant theory book of recent date which does not show that influence. Take, for example, Paul Hindemith's Unterweisung im Tonsatz (Craft of Musical Composition). Not only are many of the essential ideas in that book, for example, "melody

degree-progression," obviously derived from Schenker, but Hindemith even acknowledges Schenker's contribution, albeit indirectly, in the dedication: "Bei der Niederschrift dieses Buches war mir der Rat und die Kritik meines Kollegen, Herrn Professor Hermann Roth, eine ausserst wertvolle Hilfe." (In the writing of this book the counsel and criticism of my colleague, Professor Hermann Roth, were extremely valuable aids.) Hermann Roth was a zealous follower of Schneker, and his book, Elemente der Stimmführung, is acknowledged by him to be based upon Schenker's Kontrapunkt. Thus, it appears that even Hindemith is a Schenker "disciple," as Mr. Boatwright designates those who utilize any of Schenker's ideas.

One of the several digressions in Mr. Boatwright's review is his opposition of "traditional theory" to "Schenker method." Obviously this is not the place to begin an elaborate dialectic, but I should like to ask Mr. Boatwright to ponder the following questions: (1) What exactly is the origin of so-called traditional theory and whence comes its mandate? (2) What relation does that theory have to the compositional techniques of recognized composers, for example Beethoven, whose technical procedures are revealed in the sketchbooks?

Related to these questions is Mr. Boatwright's concern about the emphasis given the linear dimension — to the exclusion of the vertical- in Contemporary Tone-Structures. I hasten to say that I have no feelings of animosity towards chords and that if conventional chord labels could have served any useful descriptive purpose they would have been used. (I do not believe, however, that mere identification of chords, either in older music or in contemporary music, constitutes analysis.) But Mr. Boatwright feels that chords and the musical values which they symbolize are seriously endangered. He rushes to their defense, employing all the means at his disposal. He even attempts to engage the sympathy of the reader by evoking a nostalgic image of the good old days when students knew what a chord was and what a melody was and how the two "interlaced" — a condition, he warns us, which is no longer universal. The implication is that music instruction has been brought to this sorry condition by the unwholesome efforts of Schenker and his followers, a most striking paradox in view of the academic world's virtually complete denial of the existence of Schenker. Furthermore, does Mr. Boatwright have specific information regarding the results of training in "Schenker method," or is he merely speculating?

Mr. Boatwright gives a completely erroneous impression of the book when he indicates that the analytic technique does not deal with the functions of the various parts of the musical textures examined. On the contrary, the attempt is made throughout to give as integrated a picture as possible of the entire work in all its details. Mr. Boatwright apparently feels that if functions are to be described they must be related to a general theory, and not merely to the structural basis of the particular composition under consideration. However, he does not make this point clear in his review, with the result that he misrepresents the analytic approach altogether. And, of course, how, when, and where a general theory is to emerge is not discussed by Mr. Boatwright. Certainly if he has such a theory, now is the time to reveal it.

Further, there is the conflict, as understood by Mr. Boatwright, between the natural basis of music (the overtone series) and the notion set forth in Contemporary Tone-Structures that individual compositions manifest individual structural bases. Mr. Boatwright's angry denunciation of the latter notion is quite ridiculous in view of the fact that he first misstates the problem and then contradicts his own argument. This curious situation is admirably summarized, Alice-in-Wonderland fashion, by Mr. Boatwright himself when he says that "one can decide to go with or against nature in art (either action is justifiable), but this does not prove that the natural is non-existent." I shall pass over the interesting linguistic problems in that statement and simply point out that nowhere in Contemporary Tone-Structures is it suggested that the "natural" is "non-existent." Mr. Boatwright speaks elsewhere of naivete regarding physics, whereas he exhibits considerable naivete regarding the simpler processes of verbal communication. The point made in Contemporary Tone-Structures is that structural bases other than those that Mr. Boatwright believes to be derived from the overtone series have been and are being used extensively by composers, and that therefore any thoroughgoing analytic procedure will have to discover those bases, or postulates, at some stage or another in the analysis. Mr. Boatwright's confusion is explainable only as another result of his anger.

As for Mr. Boatwright's discussion of the overtone series, it requires only a few brief comments. First of all, he seems to equate the overtone series with "nature," not realizing that the overtone series is itself a construct which conceivably may one day be replaced by a different construct. Moreover, Mr. Boatwright's most forceful assertions regarding the overtone series cannot be demonstrated. He speaks of "our unconscious but continuous absorption of the tone arrangement of the overtone series in all the musical tones we hear." Now, if the absorption is unconscious it follows that it is undemonstrable. Secondly, Mr. Boatwright evaluates relationships between the overtones on the basis of "purity" or "similarity." What is the meaning of this criterion? How would Mr. Boatwright reply to an assertion that the fifth overtone is "too pure"? Furthermore, as Mr. Boatwright should know, it is impossible to derive most of the common phenomena of composed tonal music from the overtone series. The minor triad, for example, is explained with reference to the overtone series as a kind of shadow of the major triad. Moreover, the functions of the tones of the major triad have no reasonable basis whatsoever in the overtone series. Of course, I disagree completely with Mr. Boatwright's claim that the theorist "must deal first of all with what nature presents to him." It is my opinion that the theorist must deal first of all with what music presents to him. Composed music is his special field, not the physics of sound. However, I do not want to inhibit Mr. Boatwright's speculations. If he is on such familiar terms with the "nature of sound" as he seems to indicate, then he is in a position to make highly significant contributions to a number of fields, e.g., psycho-acoustics, perception theory, theory of sound, etc.

In closing I would like to express my gratitude to Mr. Boatwright for devoting six pages (the longest review in the magazine) to a book

which he indicates is completely devoid of interest to the student and merely old hat to the trained musician. Indeed, his generosity confounds me. I could understand writing a lengthy review of a bad book, but a lengthy review of a dull one...?

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RE: MUSIC READING RECONSIDERED AS A CODE-LEARNING PROBLEM

By Elinor Warner

In the March 1957 issue of the Journal of Music Theory there appeared a thought-provoking article by Stanley Fletcher on the problems of teaching and learning vocal music-reading. Mr. Fletcher drew an analogy between procedures in learning to read language and in learning to read vocal music and suggested that thereby we may develop a more efficient and effective procedure in teaching vocal music-reading. This paper claims to show that such an analogy, to be operationally effective, would have to be modified extensively and could aid in only some particular aspects of the total problem of teaching and learning vocal music-reading.

Near the beginning of his essay Mr. Fletcher makes the following statement (p. 77): "Both spoken language and sung music are patterns of sound produced vocally."

This is an accurate statement to be sure, but his description of the language pattern as "a series of changes in the quality of sound produced" is more generalized and unavoidably suspect. One is instantly made aware of some of the peculiar aspects of spoken English that may serve to hamper extensive comparison of it to sung music.

For instance, in spoken German there exist characteristics of accent and duration of small syllable units that bear relation to rhythmic elements in sung music. Conversation in the French language involves some change in pitch level as well as "differing qualities of sound," and in that respect, may be more aptly compared to sung music than spoken English.

The sound-pattern of the English language is a series of "vocally-produced noises of differing quality" as Mr. Fletcher states (p. 77). If we ignore the aspect of rhythm in music as he requests, it could then be said that the sound-pattern of sung music is a series of vocally-produced tones of differing pitches. Already a discrepancy appears, and there is another.

Letter shapes depict the differing sound qualities of spoken language as is claimed, but of course in music, note shapes depict sound duration rather than sound pitch. Today pitch representation depends on a "clarified" staff with clef and key-signature or accidentals and proper placement of notes against the staff. The desired "quality" of sound-patterns in sung music is graphically indicated in various ways,

but none of these seems comparable to the representation of differing qualities in spoken language by letter shapes.

We are here concerned with small units of language — varied qualities of sound graphically represented by single letters or few-letter groups. To avoid encumbering the analogy we have ignored the graphic representation of rhythm in music. Still, it must be acknowledged that even a small unit of sung music, such as a single interval, requires a more complicated and different kind of pictorial symbolization than does a similarly small unit of spoken language. For this reason an analogy between "encoding" written language and encoding written music is inevitably strained.

In language the written unit of code is a variable symbol, i. e., a letter or letter-group. In sung music, still leaving aside the aspect of rhythm, the written unit of code is a single note or interval. A single letter in written language seldom makes sentential sense and a single note in vocal or instrumental music seldom makes musical sense.

In regard to instrumental music a single note on a staff connotes a special mechanical operation that in turn produces an "absolute" pitch. Notes on a clarified staff specify to the instrumentalist what mechanical operations will "decode" the pitch indications into actual sound-patterns. Likewise, letter shapes and arrangements connote certain mechanical operations for the vocal chords which will result in "decoding" written language back into spoken language. In both instances the sound-patterns have only assigned qualities or pitch levels and the written codes have only assigned significance. Thus it appears that the process of decoding written instrumental music may be compared to decoding written language as accurately as a comparison between vocal music and written language.

This idea opposes Mr. Fletcher's claim that "the staff-code is not an entirely arbitrary symbolism, as written language is" (p. 92). He bases his claim on the idea that written music pictures melodic contour. However, the tacit agreement to name fast-vibrating pitches "high" tones and slow-vibrating pitches "low" tones is indeed arbitrary. More importantly, all symbolic representation can only point to or denote the actual thing and so must be limited to "assigned significance."

Let us now consider the general principles for a music-reading program suggested by teaching procedures in the language program (beginning on p. 90).

It does not seem necessary to study "interval-relationships," which I presume involves interval measurement, in such a way as to carefully avoid reference to "fixed pitch," and I'm not sure that such a manner of study is possible. It is likely that most average singers will sing music written in major or minor keys rather than in the old hexachordal or modal systems. They will sing in ensemble rather than as solo performers, and probably in either case will rehearse or perform with accompaniment. Each of these governing conditions implies a

fixed pitch reference of some kind and many conductors or teachers would check pitch accuracy by reference to a tuned instrument. Young children in early singing experiences may naturally only approximate specific intervals both visually and vocally, but for part-singing or accompanied solo singing it is essential that all sounding forces agree pitch-wise.

In regard to "recognition-vocabulary" in language-reading procedures, there may be available some useful points that could be related to music-reading procedures.

As Mr. Fletcher maintains, it is not possible to duplicate exactly the process whereby the language-reading learner acquires his basic vocabulary through associating a picture of MOTHER with that word. The important point is that the pupil acquires a selected group of understood words with which to approach unknown words.

There are simple melodic patterns — scalar, triadic and cadential — that pupils could learn as aural-visual entities separately and later recognize visually in the larger context of a song phrase. Melodic patterns from familiar songs could supply the link of familiar reference provided by pictures in language-reading. The association procedure in music-reading would be a bit more complicated than in language-reading since the pupil must go through two kinds of abstractions — notes and text — to reach the sound concept. However, if his training in language-reading has been of a similar approach, no acute problems will arise.

Syntax is defined as "shape and order" and that term is applicable to music-reading as well as to language-reading. Note shapes refer to duration in music of course and should be introduced before studies in pitch recognition. Now, as to "order": In much folk song literature and little songs by Haydn and Mozart for instance, there are at least a few small melodic patterns that we may expect to appear at the end of a song rather than at the beginning. In this music certain scale tones do maintain fairly consistent structural roles and these could be pointed out easily if the song literature is as carefully chosen as is reading literature.

For a successful music-reading program Mr. Fletcher's final general requirement is that the pupil must be carefully prepared to "resolve ambiguities in the code as the reading material introduces him to those ambiguities" (p. 90). Certainly music notation has developed into a far less ambiguous symbolic code during the last three hundred years than it was previously. Also, it is my opinion that it is a far less ambiguous code now than written English.

Duration values in music are not measurable in seconds or minutes of course, but their relative measurability is most accurate and logical. For all practical purposes it is sensible for amateur singers to learn the aural concept of written intervals as they would sound on a tuned instrument. Notational indications such as tempo and dynamic markings are indeed ambiguous and allow the interpreting

performer or conductor some chance to exercise his individual musicality.

The teaching and learning of music-reading present serious and perplexing problems. These problems are compounded if the pupil must first learn a system limited to vocal music-reading and later another limited to instrumental music-reading. In addition, if there is to be comparing or cross-referencing of learning procedures in language-reading and music-reading, we must carefully distinguish between similar and dissimilar factors inherent in those procedures.

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RE: THE ALIFERIS MUSIC ACHIEVEMENT TESTS

By David Kraehenbuehl

In Volume 39, Number 4 of The Journal of Applied Psychology, published in 1955, an article appeared written by James Aliferis and John E. Stecklein entitled "Measurement of Music Achievement at College Entrance." The article purported to describe the nature and the results of a nationwide administration of a carefully designed music achievement test. Similar tests were administered, again on a national basis, this last spring. Since this testing is being done, presumably at considerable cost to the initiating institution and at a certain loss of classroom time to music theory teachers all over the country, it seems advisable for someone who actually administered the tests to raise a question about the testing procedure.

Two sections from the report must be quoted. The first is the section entitled "Test Instrument":

"Instruments considered included the piano, electric organ, pipe organ, harmonium, violin, clarinet, and French horn. Use of the piano was seriously considered, particularly in view of its suitability for presentation of the harmony section of the test. The instrument best suited for the harmony section would be one capable of sustaining all four voices of a chord with equal intensity as well as uniform quality throughout a period of several beats. Laboratory reports showed, however, that piano tone fluctuated widely, in quality and intensity, and rapidly became inaudible. Furthermore, musicians have been found, in piano performance, unconsciously to favor the soprano voice of one chord or the bass voice of another. In an attempt to avoid these mechanical and human shortcomings, experiments were made using a pipe organ, an electric organ, and a small harmonium. Each of these instruments proved unacceptable, however. The organ was rejected because its tone in the test situation was sufficiently unfamiliar to the average entering freshman that it distracted seriously from the test problem. Attempts to adopt the violin, clarinet, or French horn were unsuccessful because no one instrument could play through the pitch range of a complete test section. The use of several instruments in one section produced distraction because of changes in timbre. After considerable experimentation, the piano was finally chosen as a com-

promise. Its inadequacies, both musical and psychological, were thought to be compensated for by its recognition as the representative instrument of the complete tonal realm, and by its widespread use by musicians."

The other section necessary to the question is entitled "Test Administrations":

"The 64 items comprising the Aliferis Music Achievement Test were selected through critical study of results obtained from two pilot administrations of earlier forms of the test. In 1947 the first form (330 items) was administered to 419 entering freshman music students in ten representative schools throughout the United States. In 1949 a revised edition of 138 items was administered to 376 entering freshmen in ten selected schools. In 1950 a second revision was administered to 1,963 freshmen students in 70 educational institutions."

Our readers are assured that the two sections of the report that bear on the question of how the tests were actually administered have been quoted here in their entirety. But does any reader who did not actually administer the tests know how it was administered from the information given above? Certainly, it would be safe to assume that a standardized test would be administered uniformly, in the case of music, by some electronic reproducing method. Nothing in the above suggests that this was the case; but, also, nothing in the above suggests that it was not the case.

The truth is that the test was administered at each of the 70 participating schools by a local theory teacher who played the test examples at the piano from notation provided by the test designers. And what harm in that? The harm is that the report, in describing the test, repeatedly assures its readers that each test item is set up so that "duration, speed of presentation, and time space between items are controlled." This is accomplished by marking the item with such unusual metronome indications as MM ♩ = 68-63. Only one of these figures appears on our metronome. If 70 of the best musicians in the world were assembled, what sort of agreement would they reach regarding this tempo without immediate recourse to a metronome? And, assuming that some of the test administrators were wise enough to realize that an absolute sense of tempo is a most exceptional gift, and therefore made use of metronomes on the spot, did the test designers, who evidently considered many aspects of distraction, give any thought to the effect of a metronome ticking throughout the administration of the test? As a matter of fact, do they know in which cases recourse was made to a metronome and in which cases the test was administered without a metronome?

One section of the test dealt with problems of rhythmic discrimination. The administrator was to play a notated rhythmic example in a prescribed number of repetitions along a scale while the examinee selected the correct pattern out of three or four offered him on the examination sheet. Many of these choices involved bizarre notations that might well have flustered the most literate music student. (Examples

of illiterate notation, unfortunately, abounded in the test itself, even in some of the examples included in the journal report. Although there is not space here to spell them out, an example would be the use of a dotted half-rest to indicate a full bar of silence in 3/4 time.) The written form of the test is not, however, our concern here. The examples to be performed by the administrator involved some relatively intricate, bizarrely notated, and extremely subtle rhythmic patterns. The examples of notation with which the student was faced frequently included patterns that might well have approximated a slight variant in the performance of the actual pattern. Were these examples performed with absolute precision and accuracy in every case? Was the level of pianistic competence uniform throughout the corps of administrators? But, most of all, do the test designers have any inkling of the relative competence of the test administrator at each of the 70 participating institutions?

This is sufficient evidence, I believe, to substantiate the validity of a question regarding the testing procedure. Presumably, the administration of an achievement test on such a wide scale has the purpose of standardization and area comparison. It is claimed by the test designers that the "results of these studies seem to justify the conclusion that the Aliferis test fills a great need for a measure of music achievement at the college entrance level." These results, as presented in the report, include comparisons between various geographical areas and various types of schools. Of course, we must imagine that such results are based on the premise that an identical test was administered to all the examinees. But, in the light of the foregoing, this seems a virtual impossibility. In any case, the test designers appear to have no way at all to ascertain exactly what was actually heard by each of the 70 groups of examinees. This being so, the claims of the test designers regarding the initial tests must be regarded as somewhat reckless, and their willingness to administer a second set of tests in the same uncontrolled manner cannot be regarded as anything but unscientific and uneconomical.

As disturbing as the unscientific basis for the tests is, the pseudo-scientific report of the proceedings is misleading and still more disturbing. If there was never any intent to administer the test in some recorded form, why was the long study of the proper test instrument undertaken? Obviously, the piano had to be used even if its deficiencies were proved insuperable. What other instrument is readily available in most theory classrooms across the country? And to make the choice of piano, in this case, hardly requires the intricate study outlined in the report and quoted here. This is what gives the report a pseudo-scientific aura. It sounds like science, but, under the circumstances, it would seem to be mere scientific gesture. Furthermore, why are we never told exactly how the tests were administered, a basic scientific fact necessary for any reader to properly evaluate the meaning of the results? Why, in fact, are we deliberately misled into the assumption of uniform administration by assurances that "duration, speed of presentation, and time space between items are controlled"?

A complete report would have shown that the tests involved the

measurement of two uncontrolled variables, the music achievement not only of the examinees but that also of the administrators. Under these conditions, the test results would have no validity whatsoever despite any of the numerous reliability and validity tests applied by the test designers and duly reported in the monograph. There is still no statistical solution, just as there is no rational solution, for any set of equations in the form $x + y = n$, provided the value of neither x nor y is known. And until there is, the significance of any results gleaned from tests administered under the inadvertantly unreported conditions that obtained with the Aliferis Music Achievement Tests is questionable.

(Note--In a circular letter received here on October 4th of this year it is stated that a tape recording of the Aliferis Music Achievemen Test discussed above is now available for those schools wishing to administer the test for their own purposes. However, if a school does so, it will still be comparing its results with those obtained by the uncontrolled method described above.)

BOOK REVIEWS

Edited by
Donald Loach

THE RUDIMENTS OF MUSIC. By William Lovelock. (G. Bell and Sons, Ltd., London, 1957, pp. 128, 10 shillings.)

"There is nothing new to be said on the subject of this book."

Convinced, despite the above statement, quoted from his Foreword, that the oft-told tale about the fundamentals of music is worth telling yet again, Dr. Lovelock of Trinity College, London, has put together a little book designed to cover the basic materials of music "theory" in a simple and orderly manner. This book is written primarily for the use of candidates for the English General Certificate of Education (though use by other beginning students of music is not precluded), and the requirements of the examinations for this Certificate, well-known to Dr. Lovelock, a former examiner, are obviously taken as the basis of the work.

The material is presented in seventeen chapters, as follows: Preliminary; Duration of Sounds; Pitch of Sounds; Rests; Simple Time; Compound Time and Grouping; Sharps, Flats, etc.; Major Scales; Minor Scales; Chromatic Scales; Intervals (I); Intervals (II); Transposition; Signs and Abbreviations; The C Clef; Short and open Score; Italian Terms; and, Ornaments. In addition, there are appendices to seven of the chapters; here the author either elaborates on some aspect of the material found in the main text, or provides supplementary information for the more interested student.

Any discussion of merit or demerit regarding the organization of this book seems unnecessary in view of the fact that every teacher of elementary music courses has his own opinion and experience in such matters, and he will champion or reject Lovelock's efforts accordingly. Furthermore, the information is presented in a clear, direct style, though some exceptions to this will be mentioned below. The basic concept behind this little book, however, requires more careful consideration; for even though the scope of the work is extremely limited, it must still shoulder a certain amount of responsibility to the art and the profession.

The minimum requirements for a contemporary manual such as The Rudiments of Music might be these: 1) that it give account of the traditional materials of music; and quite naturally, 2) that it include, without qualification, those usages that have by 1957 become "traditional" in twentieth-century practice; finally, 3) that it present all this technical information in the closest possible association with the living music of which it is the foundation. Obviously, this is a large order, maybe even an unreasonable one; but it cannot be denied that the value of a text increases in direct proportion to the number of the above re-

quirements fulfilled.

Dr. Lovelock has succeeded in fulfilling the first of these. In fact, it should be emphasized that what he has done has been well done. However, considering the date of publication (1957), it is not enough. The book emerges as little more than a new edition of any one of a number of music theory manuals that appeared in the first third of this century, blindly perpetuating most of the threadbare notions about elementary theory instruction, even to the score of little mnemonic aids to help the student remember dry-as-dust facts.

As for requirement number 2), only the tiniest hints of twentieth-century practice are given, and these are so stated as to remove them far from the realm of probability, e.g., "Rather rarely pieces with five or seven beats in a bar may be encountered" (p. 31). To illustrate this rare occurrence, two musical excerpts are quoted: 1) two bars from Tschiakowsky — what (Symphony No. 6) and where (2nd movement, meas. 1-2, 'Celli) are not indicated; and 2) one bar from Debussy — the String Quartet is named in a footnote, but the place (2nd movement, at no. 11, Vln. I) is not given. The possibility that meter might change within a piece is disposed of in note 3 (p. 125) of the Appendix to Chapter 6 with the information that "... Cyril Scott was something of a pioneer in this direction," and that Stravinsky, in his Rite of Spring, "... shows how a composer may indicate extreme flexibility of rhythm and accent." There are no exercises that apply this common practice. It should be noted that the five-bar excerpt from the Sacre, quoted in ex. 259 (p. 125), is the latest (1913) piece of music to be mentioned, and that is about that for contemporary music. The limited scope of the book does not excuse this situation, not when there is a whole chapter and some two pages of appendix devoted to Ornaments, a subject that might well have been omitted from a very basic theory manual.

Perhaps the greatest objection to the general tone of The Rudiments of Music comes in connection with requirement number 3), suggested above. Upon reading the book, one has the eerie feeling throughout that all the technical information about music is being presented in total isolation from the actual music in which such information has been or may be made to live. Not once in seventeen sets of Questions and Exercises is the student directed to sing, play or otherwise produce a sound, whereas he is given pages of problems to write, complete or explain. The fact that the exam orientation of the book may have required such unmusical treatment hardly alters the case; to the contrary, it would seem to make the whole examination business rather more suspect. The only contact with living music throughout the book appears in the form of the three examples, mentioned above, from Tschiakowsky, Debussy and Stravinsky — eight measures of music in all. It should be mentioned, however, that the text is otherwise well provided with original musical illustrations.

To return to Dr. Lovelock's style of presentation for a moment, the reader, especially the beginning student, should be wary of the author's predilection for inserting certain general phrases that tend to obfuscate the true nature of the information involved. For instance,

statements that the breve "...is not infrequently met with in older music..." (p. 4), that "In all music there is a regular, even beat or pulse..." (p. 19), or that the purpose of the bar-line is "To show the position of each strong beat..." (p. 19) would not be actually incorrect. However, they might lead the uninitiated reader to form unconscious attitudes toward the breve, rhythm and meter, or the bar-line — attitudes that would seriously hinder his progress into the realm of real music. It is a known fact that most music students must 'un-learn' many details of their elementary study as they proceed to higher levels, but the knowledge of this fact does not relieve the teacher of the obligation to do what he can to alleviate the condition.

There are, happily, few mistakes in the text, and these result more from omission than commission. The insistence on incorrect placement of sharps in the bass-clef signatures (p. 44, ex. 86; p. 48, item 19; and p. 52, ex. 100) can hardly be intentional; the German word, Generalpause (p. 98), should be capitalized; the signs denoting repeats of a single bar or a portion thereof appear reversed in ex. 220 (p. 101). As for omission, why should the author not include the French violin, the Baritone, and the Sub-bass clefs in his list of archaic clefs (p. 88), or indeed, the more popular notation of a fingered tremolo in half-note values (p. 102) — i.e., with beams from stem to stem — when he has been careful in other instances to include more than one possibility if there is no standard practice?

Perhaps it is unjustifiable to judge Dr. Lovelock's book by the standards of other theory manuals when the whole English examination system is at least partially involved. Still, The Rudiments of Music will find its place in libraries outside of England; consequently, it will be subject to comparison with other books of its nature. Today a healthy awareness of the long overcrowded, slum condition of library shelves containing such works is making it increasingly difficult to produce a worthy and useful new theory book, especially at this very elementary level. While, as Dr. Lovelock says, there is probably little "...new to be said on the subject of this book," teachers will (we trust) continue to find new and better ways to say it. Any and every attempt will be welcomed, as is The Rudiments of Music, but the number of such attempts will not diminish the responsibility. Above all, it must never become an easy task.

NICHOLAS ENGLAND

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HARMONY. By Philip B. Norman. (Consolidated Music Publishers, Inc., New York, N.Y., 1955, pp. 122, $3.00.)

HARMONY. By Peter Wishart. (Hutchinson and Co., Ltd., London, Eng., 1957, pp. 159, 8s. 6d.)

Two books on "Harmony" could scarcely be more different in aim, plan, and execution than those reviewed here. Mr. Norman's book claims to be only "an introduction to the study of harmony" (p. 121),

while Mr. Wishart's "starts with harmony in its broadest sense and ends with the simplest and most elementary harmony study" (p. 14). Mr. Norman's book is apparently intended for students with scant knowledge of music notation and terminology (chapters 1-4 discuss intervals, scales, and various simple chords almost wholly through reference to the piano keyboard with a number notation for the black keys and the usual letter names applied to the white keys). On the other hand, Mr. Wishart's book "addresses an audience which is presumed to be at the stage of the beginning of an honours course at one of our [British] universities" (p. 13), and the author presumes that the student will be familiar with the rudiments of music and of elementary harmony and counterpoint as conventionally taught. The music examples quoted by Mr. Norman demand little more performing ability than fourth-grade piano technique, (even this may be considered optional for the type of analysis attempted so long as the student, when analysis begins, has learned to name the printed notes and pick out the chords at the keyboard), whereas the reader of the Wishart book is expected to play, and not merely read, whole compositions of many kinds including standard orchestral, chamber, and choral scores, most of which are only mentioned instead of being printed in the book. Mr. Norman offers no instruction in "voicing, doubling and voice leading" stating "that these topics belong properly to the study of counterpoint" (p. 121), and that the study of harmony is "different enough pedagogically from the study of arranging or composing to justify keeping the latter separated in every possible way from the former" (p. 122). Mr. Wishart, on the contrary, takes the point of view that "music can never be just harmony or just counterpoint, or just melody, or just rhythm, and any attempt to separate all or any of these things is doomed to failure. Which is why the student can only test the validity of the detailed examples I give by these examples. It is one of the reasons why a complete book on harmony would be an impossibility, because it would involve quoting all the music ever written" (p. 17).

Other differences between these books bring to the fore several questions basic to the understanding and teaching of the structure of music. Among these one of the most important has to do with the chord concept itself and the invertibility of chords. Mr. Norman, writing a book of limited scope for students too young or too lacking in curiosity to question a dogmatic approach, has almost nothing to say about the historical origin of chords or any theory justifying their existence, but it is evident from his chord tables that he accepts as valid the construction of chords by superposed thirds and the free invertibility of all or most of the chord forms produced by that process. Mr. Wishart, on the other hand, emphatically rejects "a harmonic theory which insists on finding the root of every chord which does not happen to be $\frac{5}{3}$" (p. 16). Further (p. 17), "I do not think it is at all possible to see the results of teaching which sprang from Rameau's theory of the root of chords until the nineteenth century, and even then many of the phenomena which look like chord inversions have in reality contrapuntal ancestry." Commenting on Hindemith's The Craft of Musical Composition, he condemns the author of that treatise for "assuming that there is or ever ought to be such a thing as a chord theory" (p. 17).

In view of the known development of music, few theorists today would deny the contrapuntal origin of chords--not only the forms ordinarily described as inversions, but most of the so-called root position forms as well. And few who have given much thought to chord theory would claim that any chord other than the major triad in root position has a sound physical leg to stand on. Some, it is true, still claim a natural origin in the overtone series for the dominant 7th, 9th and 13th chords, but this is vigorously challenged by many who recognize the tuning problems created by that claim. In view of the scientific insecurity of all theories of chord structure, are we obliged to take the position that the inversion theory as propounded by Rameau and subsequently extended by others is worthless? Mr. Wishart seems to do this although he occasionally mentions "dominant harmony" in situations where the dominant note is not at the bottom. Such casual references like his use of the term $\frac{6}{4}$-chord for a combination which he refuses to recognize in any situation as a genuine inversion of a triad, are in the nature of a concession to familiar terminology probably induced by the fact that the mental picture of any object comes alive more readily when it is called by its usual name instead of some new name invented by the author. Except for relatively few lapses of this sort, Mr. Wishart consistently names all chords (without reference to any alleged root) by stating the letter name of the bass note (with or without an accidental as the case may be) followed by Arabic figures indicating the numerical intervals existing between the bass and the other parts (again with accidentals where these exist in the upper parts). This furnishes an accurate description in terms of existing constituents of the chord and should serve as well as any possible marking so long as one is to analyze music without any root theory whatever.

No one is likely to quarrel with the proposition that no alleged chord inversion sounds exactly like the so-called root position or any other inversion of the same letter combination. For that matter, no two spacings, soprano positions, or different doublings of the same letter combinations with the same note at the bottom have precisely the same sound. The fact that any change of arrangement, however slight, produces a somewhat different aural effect has long been recognized by traditional theorists, and they have generally allowed more freedom of root order in connections including one or more first inversions of triads, and less freedom of root order and part leading in connections including the so-called $\frac{6}{4}$-chords, than in connections between triads in root position alone. But recognition of aural difference in different arrangements of the same letter combination should not make us deaf to the family resemblance that exists in the multifarious forms which a given letter combination may assume in music. This is not to say that every arrangement is equally valuable in any possible context or that, in the case of certain complex chords, every conceivable arrangement is useful. But it is inconceivable that any composer could work long at his craft without finding out that the corresponding letters in most of our traditional chords can behave in much the same way in many of the possible permutations of these chords—this applies with special force to many combinations containing an augmented fourth or diminished fifth, or an augmented sixth or diminished tenth or third —or without discovering that there are many situations in which the

part leading can be purposefully guided with little or no trouble to pass through a predetermined arrangement of a particular letter group conceived as an inversion of a recognized chord. Even the much maligned $\frac{6}{4}$-chord, which is obviously decorative in effect in most of its familiar contexts, can be used on occasion with excellent effect as a substitute for the $\frac{5}{3}$ or $\frac{6}{3}$ arrangement of the same letters if the part leading is skillful enough. How else can one explain the series of three $\frac{6}{4}$'s in bars 36-37 of Franck's third Choral for organ? If these are not essential chord forms, deliberately substituted for other forms of the same letter combinations, what are they? This passage may be dismissed, if one hates Romantic music in general and Franck's music in particular, as an unforgiveable aberration—a reductio ad absurdum of the inversion theory. But if this be sin, Franck is not the only sinner! Brahms, and many other composers of acknowledged musical integrity have sometimes been impelled to write a $\frac{6}{4}$ obviously used as an inverted triad—sometimes even with a leap in the bass!—so why deny the possibility of inversion at this late date?

To the extent that the inversion theory suggests to a composer—or student—the possibility of substituting one form of a particular letter combination for another, this theory can not fail to have some practical value even if the leg it stands on is precariously wooden. This reviewer heartily supports Wishart's contention that combinations which can be explained on the basis of the melodic decoration of simpler chords are best analyzed in that way—this has been a cardinal feature of the writer's teaching for many years—but one does not, for this reason, have to deny the utility of the inversion theory as a convenient "rule of thumb" in cases where it really works. What is much more to the point for many harmony courses is for the teacher to rid himself of the notion that there are any permanent or sacrosanct rules of root order and chord resolution. Unless one sets out deliberately to limit a student's technique to the clichés of a particular composer—a procedure of the most doubtful value except as a temporary exercise in style—the study of root order may easily do more harm than good, especially if a fetish is made of "quantitative analysis" and the compilation of tables of percentages showing the frequency of particular successions of roots apart from the all-important considerations of part-leading and chord arrangement. Fortunately, Mr. Wishart's renunciation of a root theory has kept him from falling into the statistical pit so happily occupied by a certain type of non-composing Ph. D. candidate.

Mr. Norman's two-page discussion of tonality and modulation begins (p. 88): "A modulation is a change of tonality, which can be either permanent or transitory. A permanent modulation is denoted by a change of signature... There is no change of signature if the modulation is transitory." Mr. Wishart, in two chapters covering some 56 pages, argues from a very different premise. In his thinking tonality and modulation are not fixed by signatures, nor by the mere presence of accidentals even when the accidentals clearly produce cadences, phrases, or periods which could occur in another key without accidentals if the signature of that key were to be provided. For Mr. Wishart, as for many theorists today, tonality is a very broad tent indeed, permitting under its shade many maneuvers with accidentals

which were formerly described as transient modulations to other keys. He feels so strongly about this that he condemns anyone and everyone who may be rash enough to apply the term modulation to any musical event possible within a single phrase, period, or short section. Limitations of space preclude any detailed discussion of alternative points of view, but it should be said in defense of the benighted teachers and examiners who must deal with elementary students that training in the modulatory process in miniature necessarily comes before the composition of a sonata. Reserving the term decisive modulation for a really important change of tonality occurring at the entrance of a new theme or new section of development may be an advantage when one is engaged in analyzing a large composition, but consideration of modulation in its broadest applications should not make us insensitive to those fleeting references to other keys which occur again and again within a much shorter space of time. What is so wrong in thinking of the terms transient and decisive as purely relative when applied to the modulatory process? Ending a single phrase with a clear-cut cadence in a nearly related key may well be decisive for that phrase although it is no more than transient in a period. Similarly, a clear-cut reference to another key at the end of a period may well be decisive for that period although it may be merely transient in the next larger unit of form. Must we arm with a weapon fit to slay a dragon when the offender is a mere household pet?

Much more could be written if space permitted. Suffice it to say that the Norman book may fill a useful niche in a high-school curriculum and that the Wishart book, because of its controversial emphases, should stimulate and challenge teachers, mature musicians, and university students.

H. LEROY BAUMGARTNER

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KEYBOARD HARMONY AND IMPROVISATION. By Maurice Lieberman. (W. W. Norton and Co., Inc., New York, N. Y., 1957, pp. 381, in two volumes, each $4.00.)

Don't be misled by the title; Keyboard Harmony and Improvisation embraces most of the components of correlated theory. Like so many educational publications today it can be used with great flexibility in a wide variety of situations. Designed for colleges, conservatories, and private classes, it is adaptable also to high schools. Its material may be pursued independently or in conjunction with written harmony, though the latter approach seems superfluous since this text illustrates amply the rules and regulations necessary to "achieve a worthy result" in keyboard harmonizations. In fact the explanations and directions (to quote the Preface) are so clear as to save much classroom time and indeed, to make self-instruction feasible. The difference in this textbook lies in the shift of emphasis: keyboard dominates; written work and sight-singing contribute; dictation (reverse keyboard) participates not at all.

In two volumes, spiral bound with paper covers, carefully laid out from a visual as well as a material standpoint, Keyboard Harmony and Improvisation may be said to be a thorough book. Its 400 pages abound with examples taken from the classic literature, folksong, and other sources. Some 223 exercises (not to mention the sub-heads) are supplied for the student to perform at the piano. There are 16 key plans of the most common key relationships in Cadences of the Four Phrases of a Double Period (8 each, major and minor), and 48 examples of scale harmonizations covering ascending and descending majors and minors (harmonic and melodic) in treble and bass. Unfortunately, there are a number of typographical errors, some of which are insignificant while others may cause considerable confusion.

The effectiveness of the approach for the objective set is more than probable. Professor Lieberman has successfully taught the text's general principles in his classes at Brooklyn College over a period of many years. Setting the pace for a 2-semester course meeting twice weekly, the author is able at the end of the 15 pages that comprise Chapter I to state that he has carried the student through the beginnings of melody and chordal accompaniment, introduced him to the smallest coherent unit in music (the motive), and secured in his mind the I-V-I progression as the basic progression in music. He has also rendered a number of definitions, some absolute, others temporary, according to immediate needs. But the accent has been and will continue to be on drill routines. Already there have been 26 of them, most of which have received recommendation for transposition into all the major scales, offering 400 or more availabilities to the curious beginner. In the pages that follow the general and exceptional regulations governing structural relationships, vertical and horizontal, generally referred to as conventional theory, are dealt with in an exhaustive, scholarly manner. While not achieving automatically the ultimate possibilities inherent in a mathematical approach to variation, Professor Lieberman has succeeded admirably in illuminating the universally-accessible devices by which minute amounts of source material can be converted into staggering sets of exercises.

An approach which lavishes "method" while confining source material forces im-balance, resulting in originality by escape alone. Suppose we start instead at the other extreme; limited devices applied to wider areas of source material. Beginners evolve harmonic progressions from many scales, — but majors? — well, hardly ever. Tonic-dominant harmony, — perhaps, but certainly involving chord systems based on 2nds, or 4ths — never on 3rds. What would happen if after a year of such exposure, the student were introduced to the refinements of the craft that have given us our Mozarts and Beethovens? At the moment I am using Professor Lieberman's Keyboard Harmony and Improvisation with a second year class, hoping to cover one volume each six weeks on a schedule of 3 class meetings weekly. By the end of the semester, I should have an answer, — of a sort.

EDWIN GERSCHEFSKI

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TONAL COUNTERPOINT. By Leland H. Procter. (Wm. C. Brown Co., Dubuque, Iowa, 1952, 1957, pp. 157, $3.00)

The title of this book bears a somewhat oblique relation to the contents, for the book is not a study of tonal counterpoint in living music, but primarily a series of lessons in dissonance regulation in the style of Bach.

Apparently designed for a one-semester first course in counterpoint, Mr. Procter's manual begins with the harmonization of chorales in three parts. Later chapters demonstrate the use of non-chord tones, which are used to "animate" the lower voices of the harmonization, in what is intended to be an approximation of chorale-prelude style. The various non-chord tones are copiously illustrated by the author's own examples. Closing chapters pose other problems for the student: embellishing the chorale melody and, finally, omitting it altogether to write "free counterpoint" in two and three parts. It is indicative of Mr. Procter's approach to counterpoint that the final, and longest, chapter is headed "Extended Treatment of Dissonance."

Now it must be admitted that dissonance regulation is a contrapuntal concept in so far as it deals with the interaction of melodic lines. But it is a factor of scant importance in the larger aspects of counterpoint — aspects which are virtually ignored in this book. To begin with, there is almost no attention to the central problem of rhythmic relationship among the voices in a contrapuntal texture. There are several hints that the author is not unaware of the importance of this consideration, but nowhere in the book does he come face-to-face with it. What is more, he fails to call the reader's attention to elementary facts, such as repose in one voice versus motion in another as a means of attaining contrapuntal quality.

Also seriously slighted is the topic of melody. The following advice is typical: "The absence of a cantus-firmus will leave you a free hand to follow your own melodic instincts as long as your use of dissonance follows the traditional patterns, which should by now have become somewhat habitual... The first few beats of the most conspicuous voice should become the motive, which will then be used as much as possible throughout."

In fairness to the author it must be pointed out that the overemphasis on dissonance regulation is by no means peculiar to this book among textbooks on counterpoint. Mr. Procter's book is just one more illustration of the subtle way in which the field of music theory is often dominated by its own pedagogy. This domination is manifest here in the tendency to teach what lends itself to teaching (dissonance regulation) at the expense of basic contrapuntal principles.

The manner of presentation in Tonal Counterpoint is generally quite clear. Rules are based, happily, on facts of style rather than on the author's predilections, as in the case of many comparable textbooks. As a treatment of dissonance regulation in the style of Bach, this is a creditable piece of work. One wishes, however, that the text

had been illustrated with examples from the music of Bach himself.

JOHN CLOUGH

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AN APPLIED COURSE IN GREGORIAN CHANT. Trans. and ed. from the official course syllabus of the Gregorian Institute of Paris. By J.R. Carroll. The Church Musicians Bookshelf, Series II, No. 2. (Gregorian Institute of America, Toledo, Ohio, 1956, pp. 147, $3.00.)

As the title page indicates, this book is a translation of a course syllabus, with a few editorial comments. Such a manual may be expedient to fill a gap in pedagogical literature or to supplement the publication of a series, but one may question its ultimate value. For it is obvious that the substance of a course lies not so much in the syllabus, a more or less orderly summary of materials covered, but in the teacher and the way in which these materials are presented. The present book can hardly be an "Introduction to Gregorian Chant," simply because it must omit the discussions and explanations which bestow true order and meaning upon the materials.

This objection might better be made by asking the identity of the intended reader or user of the book. We have already indicated that it must be accompanied by a teacher, and in fact one well-versed in the subtleties of Solesmes techniques. But is the book a guide to the teacher or a text for a class? Most of the first chapter, "Graded Study of Gregorian Notation," (pp. 12-80) is taken up with the reproduction, in extenso, of compositions from the Liber Usualis, to which the reader is referred for additional material. This obviously identifies the book as a class text. But surely serious students of Gregorian Chant, (not to mention the "Church Musician") will own their own chant-books; and as an alternative a good deal of study material is available in the smaller publications of Desclée and Company. It might be that the examples enable the book to be the sole text for a layman's course, but such is obviously not the intention.

One wonders, furthermore, about the preparation and level of the prospective student. In the first chapter he is introduced to what a staff might be, and in the third he is plunged into the sophisticated intricacies of rhythmic esthetics, being confronted (in pages 86-87) with "Classification of the Arts," "Order and Proportion in the Arts," "The Arts of Movement," and "Matter and Form." Then follows a dense exposition of the Solesmes theory of rhythm. The theory itself is not an issue here — although, in passing, the reader would probably like to know what determines the placement of the accent in the examples on page 97 —but there is a real question as to whether such material can successfully be communicated in the absence of a trained teacher, especially when presented in outline form. It is this reviewer's experience that equivalent results in performance may be achieved by simple demonstration without benefit of esthetic rationalization. In the long run, where matters of such subtlety are involved, successful imitation can occur only with aural experience. As Guido of Arezzo put it, in

discussing related problems, "Some things are better learned by listening than by reading."

Speaking of Guido, it is interesting to compare the disposition of materials in his Micrologus with that of this syllabus. Guido spends most of his time discussing problems of melody, leaving a brief mention of rhythm to the end. In the present book Chapter I (chiefly examples) takes up the neumes and their names; Chapters II, III and IV (to page 119) deal with matters rhythmic; Chapter V (pages 120-133) disposes of Modality and Transposition; the remainder of the book handles "The Latin Word," and "Psalmody," only four of the Vesper tones being treated. The editor excuses the brevity of the chapter on modality on the grounds that the material is "taken up again in regular courses on modality," (not included in the present book). But the brevity of this chapter is in no wise commensurate with the extended treatment of rhythm in the preceding chapters, nor with the actual number of pages taken up by musical examples in the first chapter. One third of the space devoted to modality is given over to transposition of the modes into any of the twelve modern keys, but it remains obscure to this reviewer what might be the purpose of such material in the singing of chant. The space could at least have been devoted to explaining more clearly to the reader the relation between a "final," a "modal tonic," the bottom note of an octave species and the last note of a composition. The last named phenomenon is not mentioned save in the second paragraph, which incidentally eliminates the plagal modes. The confusion is not helped by Article 127, which remained unintelligible to this reviewer until he realized that the translator rendered "ton" as "tone," meaning thereby "key." (Also, in passing, one would like to know more about that species of "ancient music," mentioned on page 122, which used octave species on all degrees of the diatonic system.) In general, however, the translation is very smooth; it also succeeds in preserving a peculiar Solemnity in stating the obvious — or the obviously controversial:

> 104. Now, then, the basic concept of a thing cannot be drawn except from those elements which present within it the two characteristics of permanency and consistency, that is, the qualities which are found 1) at all times, unchanging with time or circumstances and 2) in every case, regardless of the special nature or unique aspect or unusual character of the case at hand.

A publication which presented in detail and in depth, as well as in English, an up-to-date description of Solesmes rhythmic theory and practice would be welcome. An "Introduction to Gregorian Chant" which discussed primarily chant would be indispensable. It is difficult to determine the function of the present book.

RICHARD L. CROCKER

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MUSICAL ACOUSTICS. By Charles A. Culver. Fourth edition. (McGraw-Hill Book Company, Inc., New York, N. Y., 1956, pp. 305, $6.00.)

Culver's Musical Acoustics first appeared in 1941, and second and third editions were issued in 1947 and 1951. The fourth edition (1956) brings the book up to date, incorporating the latest findings of research workers in the field, including recent results secured by the author. Two new chapters have been added at the beginning of this new edition (one on basic concepts and one on simple harmonic motion), and problems are given at the ends of many of the chapters.

This book's main virtue is its fresh connection with recent acoustical research. It also has a section on "hearing" which is better illustrated and more clearly written than any of the other discussions of this subject in books for the music student or general reader. But the quality of the book deteriorates at points where the author tries to connect acoustics directly with music. This is because Mr. Culver, like many other writers in the field of "acoustics for musicians," is not nearly as well-versed in musical matters as he is in science. The ideal combination of acoustician and equally advanced musician has yet to occur.

Judging from his preface and from Chapter 9, which is real music theory (intervals, chords, tempered scale), Mr. Culver is not entirely clear as to where music and acoustics are separate and where they are joined. At the end of the preface he makes the following statement: "Music is both an art and a science. It is the author's belief that a knowledge of the means and processes by which music is produced, recorded, and transmitted will serve to contribute to the greater enjoyment of this, the noblest of the arts." A kind hope, to be sure. But we know, really, that this subject has nothing to do with the enjoyment of music. No one is going to ask for a showing of a tone picture to confirm his impression that a certain singer has a beautiful voice.

If the above quoted statement were merely a preface flourish, there would be no reason to be concerned with it. But here and there throughout the book one feels that Mr. Culver really expects his machines and his investigations to produce significant results for music lovers and musicians. For example, on page 157: "The tone quality of a plucked violin string depends to some extent on the point of excitation, as indicated by the waveform shown in Fig. 11-9. Violinists are often somewhat careless in playing pizzicato notes. Apparently some performers are under the impression that the point at which the string is plucked has no bearing on the resulting tone quality — an erroneous opinion, as the records show. The foregoing observation holds for the players of all stringed instruments. It is to be hoped that a reform in this respect may be accomplished." What Mr. Culver tells us here, as a result of waveform investigation, was known by good string players long before the first waveform picture was made.

Perhaps it is a mistake for a book on musical acoustics to try to justify itself on practical grounds. The subject justifies itself as science. Painstaking investigation and description of nature never has

to be connected, as a scientist like Mr. Culver knows, to any immediate practical result. And even musicians can have the sort of intellectual curiosity which may cause them to want to know about a thing for no other reason than that it is there to be known.

The real opportunity for a connection between acoustics and music, with practical results for music theory, comes in Chapter 9, which deals with intervals, chords, and the tuning of scales. But Mr. Culver's limited musical background, and a too exclusive reliance on books and papers by his fellow acousticians causes this section (which should be the climax of an acoustics book directed to musicians) to be the weakest part of the book.

The discussion of intervals, and consonance and dissonance, refers only to such writers on acoustics as Helmholz, Koenig, and Sabine. But at this point Mr. Culver should have brought in the work of music theorists along with that of the acousticians. A music theorist such as Hindemith, for example, has made fruitful use of the theory of difference tones in the theory of intervals. Mr. Culver, who has a good discussion of difference tones in another part of the book, does not mention their possible use in the theory of intervals — because the acoustical literature on which he relies exclusively seems to have contained no paper on that subject. The theory of intervals, however, has a long and interesting history (in music theory), and the work of the acousticians, which is relatively new, needs to be considered in this whole context; it should be integrated with the work of music theorists to produce the most fruitful results.

Mr. Culver's treatment of scales and equal temperament gets along somehow without ever mentioning the Pythagorean (or any other) comma. The reasons for the long struggle that led finally to equal temperament do not emerge in this presentation. While Barbour's work on the history of temperament is mentioned, all we get for background here is: "The introduction of the equally tempered scale is usually credited to Johann Sebastian Bach [!], but it appears that this system of temperament was known long before Bach's time. Before the equal temperament plan was introduced, there existed another system of temperament, introduced by Zardino [Zarlino?] and Salinas, and known as unequal or meantone temperament."

As for matters of production, this book is handsomely equipped with very clearly reproduced diagrams and photographs. The text has apparently been reset through the whole book, as there are occasional typographical slips, such as in the paragraph quoted above. The style of writing is clear enough, although the two new chapters at the beginning are less smooth than the older, more worked-over chapters. And the two new chapters lack the bold-faced type which is used to bring out important points in the other parts of the book.

HOWARD BOATWRIGHT

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THE ELECTRONIC MUSICAL INSTRUMENT MANUAL. By Alan Douglas. Third edition. (Pitman Publishing Corporation, New York, N.Y., 1957, pp. 247, $7.50.)

THE ELECTRICAL PRODUCTION OF MUSIC. By Alan Douglas. (Philosophical Library, Inc., New York, N.Y., 1957, pp. 216, 155 ill., $12.00.)

The author's assumption that the reader has a working knowledge of the basic principles of electron devices and electronic circuits appears to indicate that The Electronic Musical Instrument Manual is intended primarily for engineers and technicians who are interested in the development or manufacture of electronic musical instruments, and for experimenters who have had some experience with electronic and other electrical circuits. Except for a few ambiguous or questionable statements, the book is well planned and written.

Following a brief but adequate discussion of sound, music and noise, and the structure and characteristics of conventional multitone instruments, the author presents a survey of the various electrical methods of producing, modifying, and mixing tones. A short chapter is devoted to amplifiers, tone controls, and loudspeakers suitable for the amplification of the output of electrical tone generators and the conversion of the electrical currents into sound. The structure, principles of operation, and characteristics of various commercial electronic instruments are then discussed. The detailed circuit diagrams of these instruments will be of interest and value only to those versed in electronic circuitry. In the last chapter, the author suggests fruitful avenues of research for the experimenter. A bibliography of 57 items is appended.

With the exception of greater emphasis upon the physics of musical instruments and upon musical scales and intervals, The Electrical Production of Music covers essentially the same ground as The Electronic Musical Instrument Manual. The style, however, is inferior and could have been improved greatly by judicious editing of the manuscript. Numerous ambiguous statements, and some that are incorrect, do not help the clarity. Quite a number of the circuit diagrams and pictures are not explained adequately and cannot be readily understood without explanation, even though the reader may have a good understanding of electronic and other electrical circuits.

The discussion of the physics of musical instruments might well have been condensed considerably. The person who is interested in the production of music by electrical means is not primarily interested in the mechanism of sound generation by conventional instruments, but rather in the factors that determine the distinguishing characteristics of the sounds produced by these instruments, and in the manner in which these characteristics can be approximated or modified electronically. A table listing the relative amplitudes of the fundamental and the overtones generated by various instruments would therefore appear to be of more practical value than explanations of sound production, particularly if these explanations are not entirely clear.

The explanation of musical scales and intervals would be clearer if the author had pointed out the relation between the intervals of the natural scale and the overtones contained in the sounds produced by conventional musical instruments.

Although much of the subject matter of this book should be of interest to the musician who wishes to learn about the principles of operation of electronic musical instruments, the level and method of presentation are such that this book is not likely to prove of great help to anyone who does not have at least a working knowledge of the field of electronics.

It is difficult to realize that these two books are the work of the same author, and their prices are not indicative of their relative merit.

HERBERT REICH

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PHYSICS AND METAPHYSICS OF MUSIC AND ESSAYS ON THE PHILOSOPHY OF MATHEMATICS. By Lazare Saminsky. (Martinus Nijhoff, The Hague, Holland, 1957, pp. 145, Glr. 10.45.)

We shall confine ourselves here to the first essay in this slim volume of philosophical reflection, occupying pp. 9-54, which we conclude, from the publisher's blurb, is the summation of the author's long development as an artist and thinker. "This peripeteia of a very young and fanatical Kantian moving up in his most mature years to a provoking scrutiny of the fast flow of facts—or disputes—as to the new mathematics and cosmology, has its climax, or its 'revelation' in 'Physics and Metaphysics of Music'. In this work, of a kind which we believe has nothing comparable in the philosophical literature, the author has truly emerged into a high sphere of philosophy of art and linked his thought to a vigorously formulated view of the Ultimate Real."

What Mr. Saminsky is saying is a reiteration of the most ancient general theory of music, namely, that music is the image of the universe. Although Mr. Saminsky never says this, or anything, for that matter, so simply, he makes it clear that he intends to define the nature of the universe and to show the relevance of music to it. For him, the universe consists of two "vortices." "Its one aspect is the ever boiling, ever changing and crumbling, ever dying and rising outer world—the phenomenal world... The inner vortex is a calm 'wave'. Its nature we sense—even identify ourselves with, only at exceptional moments—as aimless, changeless, subliminal... this Ever Present is obscured by the flux and mirage of the phenomenal world. Yet it emerges in gleams of a peculiar vision." The author's task is "to show that the instrumentality of music is spurred by that above mentioned peculiar vision; sparked in exceptional moments by the Major Self; and that the inner line of the musical order, that music's innate 'design', reflects a subliminal gleam, that of the Ever Present."

Mr. Saminsky finds "return" to be the essence of the subliminal.

He seeks to demonstrate the reversibility of time, hence the feasibility of formal return as the structural basis for the musical image of the universe, the "Ever Present," as he prefers to term it. The most beautiful summary of his thesis is strangely reminiscent of the much more forcefully put fifth part of T. S. Eliot's Burnt Norton. Saminsky says: "What does one read in the eternal pattern of music?—To become, yet to be; to move, yet to stand still; to change, yet to remain the same thing." This simple statement of the truth is the most telling line in the entire essay.

What can one say about such an essay? It is an example of the purist expressionism, the highly personal reflections of a sensitive personality. But perhaps we are permitted to ask, since these personal maunderings have been broadcast through publication, whether they mean anything to anyone else. We are aware that the works of Mr. Saminsky are spoken of in awe by many significant musicians and thinkers but we find ourselves in the uncomfortable position of the small boy who was finally forced to say in hushed tones: "But the Emperor has no clothes!"

We might speak of organization. One can but doubt the orderliness of any expression of thought that requires a new paragraph for virtually every sentence. The look of the page suggests formlessness.

We might mention the embarrassment occasioned by the bizarre and self-conscious substitutions for the word God in every instance that God was obviously meant. Was this some sort of false modesty that prevented the author from mentioning so great a subject-matter directly, or was it the natural reluctance of a pantheist, perhaps even an atheist, to suggest the existence of a God?

We find ourselves shocked by the willingness of the author to warp even the work of a dear friend in order to make it fit his inflexible Procrustean bed of a universe. He observes, in the work of an artist friend, the pattern ABACAD, but, in order to make it fit his circular notion of the universe, he casually sums together the last two sections producing a more satisfactory form for his purposes, ABACA.

But the core of the problem is the question of reversibility, particularly when it is applied to time. The truth is, that the author, like most advocates of cyclicism, is confusing space with time. However, he saves the situation by postulating time, itself, as another dimension of space, for which notion he draws support from Einstein and others. But, since music is a succession of acoustical events in time, hence demonstrating no spatial aspect whatsoever, what advantage is gained by counting time another dimension of space? Nor does time, in any case, necessarily demonstrate all the properties of another dimension in space. We may invert a three-dimensional object in space, but, to do so, requires new time; we may hold an object up to a mirror and create its mirror-image, but, to do so, requires new time. A space, once defined, is recognizably mutable, provided we are granted the time to make the mutation. Time does not "return." If a person walks in a circle in a forest and returns to his original starting point, no one

becomes so confused as to imagine that he has returned to the same time of day as when he departed. Why do we make this mistake repeatedly when we examine musical forms? Why do we speak of a "return" of an idea when what we really mean is the reiteration of an idea? And, most of all, why do we insist upon defending the error with clouds of verbal mysticism that would seek to turn poor woodsmanship into a glimpse of eternity?

Apart from the content of the essays, the presentation of them by the author and the printer suggest a considerable disregard for what the publisher claims to be their deep significance. Writings of such universal import should not contain various spellings of such words as "ontological" and "anthropomorphic" on the same page. There are even places where the confusion of em- and en-dashes results in a serious distortion of the author's meaning.

DAVID KRAEHENBUEHL

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THE THEORY OF HARMONY. An inquiry into the natural principles of harmony, with an examination of the chief systems of harmony from Rameau to the present day. By Matthew Shirlaw. (Dr. Birchard Coar, Dekalb, Ill., 1955, pp. 484, $6.50.)

Dr. Coar's edition of The Theory of Harmony is a reprint of the first edition by the Scottish musicologist, Matthew Shirlaw, published in 1917 by Novello & Co., Ltd. The first edition, published in Ernest Newman's series, "Handbooks for Musicians," has, regrettably, been out of print for many years. The new, unchanged edition fills a long felt vacancy: it is the only comprehensive treatise on the history of harmonic theory in our time!

It is true that Hugo Riemann had published in 1918 — one year before his death — a second, enlarged and revised edition of his Geschichte der Musiktheorie im IX.-XIX. Jahrhundert (first edition: 1898, Berlin: Max Hesses Verlag); however, only the third and last part of this work treats harmonic theory pp. 389-529 beginning with G. Zarlino (1517-90) and ending with a brief outline of Riemann's own ideas on the subject. Considering Riemann's self-willed personality, it is easy to understand that the way he deals with the various harmonic theories is often rather subjective.

It is futile to compare treatises written during the evolution of European harmonic theory, as, for example, F. J. Fétis' Esquisse de l'histoire de l'harmonie (1840), with those from the beginning of our century which view the entire, then virtually completed development of harmonic theory.

Certainly, there are quite a number of good and reliable monographs on eminent individual personalities, as, for example, the one by Antonio Capri entitled Giuseppe Tartini (Milano, 1945), but in works of this kind the main stress is laid upon the whole personality -- the

life and the works in all fields — treating the achievements in theory in general and in harmonic theory in particular when considered desirable by the biographer.

In general, the older treatises on harmonic theory are extremely difficult to obtain since no new editions whatsoever have been published so far either of the original text or in translation. (This year a doctoral thesis was accepted at the University of Zurich containing the original text and a complete German translation with commentary of Tartini's Trattato di Musica. This thesis has not yet been published.)

Excluding the more or less concentrated excerpts in the various encyclopedias and dictionaries, Shirlaw's book remains the only one which gives a complete, detailed and objective representation of European harmonic theory from Zarlino to E. Prout (d. 1909), the last representative of the so-called English School of theorists. In Shirlaw's book we find circumstantial summaries of all important works on the subject, so that, indeed, his book serves, especially, as a practical reference to individual treatises.

J. Ph. Rameau receives a predominant place in Shirlaw's book. Half of the first and all of the second part are devoted to the analysis of Rameau's different theoretical works. The third part deals with the Italian, G. Tartini, the Germans, G. A. Sorge, F. W. Marpurg and J. P. Kirnberger, the Belgian, F. J. Fétis, and finally with the Germans, M. Hauptmann, H. L. F. Helmholtz, A. von Oettingen and H. Riemann, and the English, A. Day, G. A. Macfarren, F. A. G. Ouseley, J. Stainer and E. Prout. The beginning of the first part, leading up to Rameau, displays the various schools of thorough-bass and the theories of G. Zarlino and R. Descartes. Remarkable is the final chapter of about thirty pages giving the author's "Résumé and Conclusion."

Even though musical harmony, after a short but brilliant development, does no longer afford fresh ground for the theorist, the knowledge of its theory, nevertheless, still constitutes a compulsory part in the building of true musicianship, which means more than mere practical training. For this reason Shirlaw's book deserves wide propagation amongst musicians of all branches.

ERWIN JACOBI

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ON THE THEORY AND TECHNIQUE OF CONTEMPORARY MUSIC. By Eino Roiha. (Suomalainen Tiedeakatemia, Helsinki, Finland, 1956, pp. 80.)

Roiha, a Finn who died in 1955, covers ground already somewhat familiar to readers interested in this field. Nevertheless he suggests stimulating ideas and illuminating analogies, and if he is sometimes inclined to pursue the obvious, he seldom fails to follow up his findings with thought-provoking criticisms and comments.

Problems of tonality, the author feels, are of the highest importance and offer great difficulties to the student of contemporary music. Consequently, he devotes more of the work to discussion of these problems than to other aspects of his subject. Will the definitions of tonality given by Fétis, Rockstro, D'Indy, fairly comprehensive as they may be, serve us today? Can music be anything but tonal? Or does tonality, like morals and manners, differ according to historical and geographical circumstances?

The development of what the author calls "harmonic tonality" is briefly outlined, beginning with modal cadences. Many intrepid pioneers — Gesualdo, Mozart, Beethoven, Wagner, the Romantics — pushed back the tonal frontiers. (Beethoven, as Scherchen has pointed out, almost reached a 12-tone row at the point in the Ninth Symphony where the basses sing "Ihr stürzt nieder, Millionen?"). "The function theory of Riemann," says the author, "is also a sign of 'extended harmonic tonality'." The theory of substitute chords, the use of chromatically altered tones, a general expansion of tonal resources — all have brought about tonal emancipation. "We are no longer the prisoners of the key," writes Hindemith. "Rather, we now have a free hand to give the tonal relations whatever aspect we deem fitting."

Polytonality is discussed good-temperedly. Milhaud is quoted where he cites a two-part canon by Bach in which the "common tonality" is determined by the upper voice, whereas it is Hindemith's opinion (to be found in his Craft of Musical Composition) that "the game of letting two or more tonalities run along side by side and so achieving new harmonic effects is, to be sure, very entertaining for the composer, but the listener cannot follow the separate tonalities, for he relates every simultaneous combination of sounds to a root" — and only one. We are unable to "conceive of additional roots somewhere above, belonging to other tonal spheres." Although Hindemith discards polytonality as a principle of composition, Roiha finds traces of it in his music. Here, speaking for himself, Roiha holds that "the question of polytonality is not only a musical but also a psychological one." Using what would seem to be an appropriate analogy, he compares musical texture to visual representation. A painting has principal features and also a background. If the work is to make its proper impression, the values should not be confused. Similarly, in auditory perception, the thematic material, the main "idea" at the moment, should have our attention; the rest, relatively important as it may be, will be on a somewhat lower plane. The relationship must be clear. Even in polyphonic music, one voice is apt to be a momentary leader. Human perception is selective. If two unrelated tonalities sound, the ear and mind follow the one which by virtue of its thematic, or perhaps dynamic, importance becomes the dominating one.

In a chapter on chord construction there is a discussion of Hindemith's theories, but only an allusion to Schönberg's. The function-theory of harmony developed by Riemann's disciple, Hermann Erpf, is briefly described. Roiha analyses in a convincing manner part of the Introduction to Stravinsky's Le Sacre du Printemps. As usual in matters of analysis there is room for a variety of interpretations. Roiha tries

to follow principles that do not "conflict with the judgment of the ear." Auditory perception is always to be considered. He treats melo analysis as depending neither on melodic degree progressions nor tirely on harmonic implications, other considerations being at least important. At the same time he would avoid the over-simplification proposed by one theorist, who explains a certain melody of Hindemith's as being "a freely moving melodic line in the tone-space, so that one can hardly imagine any harmonic tonal relations." Roiha expresses doubts about Hindemith's own theory of chord roots. Hindemith, he says, "first analyses the roots in principle and then determines the tonality." Roiha himself prefers to regard "the tonal environment and the key relations of the figure" (corresponding to the main idea or figure of the painting) as of greater importance. Hindemith, of course, would readily agree that practical considerations sometimes take precedence over theoretical ones. Both writers are aware that the diverse cannot always be reduced to the identical.

The concepts of the "pre-functional," the "functional" and the "post-functional" are to Roiha the "major landmarks in the course of music history." Furthermore, he says, "we might even consider minor divisions, such as pre-functionalism in one-part music, pre-functionalism in multi-part music, or pre-functionalism of the Gothic era, of the Renaissance era, etc., or classic functionalism, romantic, post-romantic functionalism, etc." "Post-functionalism is the tonality of our century," says Roiha; "it has furnished the language of Schönberg, Stravinsky, Bartók, Hindemith, Honegger, Milhaud, Messiaen, and others." (Debussy might be included; and what about Ives?) More space might nave been devoted to discussion of the concepts referred to above. The reader who encounters such terms for the first time may find the author's sketchy comments somewhat unsatisfying. More easily grasped, fortunately, are the modest summaries of the working principles of the composers mentioned.

Atonality ("any principle of tone relations wherein the tonal unity is due to factors other than a 'tonal center'") is considered. The twelve tone technique -- a theory really new "in the musical thinking of this century" receives treatment that is adequate for general purposes. Even specialists might be interested in the author's thoughtfully formulated appraisal of this type of musical expression. Roiha's criticisms are based, as is usual with him, on grounds of auditory perception. He invokes once more the psychological law of "figure and ground" (referred to above). While the technique, he feels, enables composers to make music free of the old obstructive laws, and to achieve many interesting results, he doubts whether the mind of the listener, with its tendency to expect tonal tensions and relaxations in music — whatever its nature — can make sense of the complex sounds. As pointed out at the beginning of this review, it seems to be tonality that is uppermost in the author's mind. He regretfully acknowledges that this all-important factor is missing in what otherwise might be a challenging movement. Berg's statement that atonal compositions do not necessarily lack a central harmonic conception of their own fails to reassure him. What he is forced to observe is a new major musical development proceeding without attendant new tonality — without, in fact, any tonality at

all.

Other interesting comments are found in sections dealing with such subjects as 1) harmonic fusion, a feature for instance, in "Les augures printanières" of Le Sacre; 2) acoustical considerations such as the difference of frequencies of tones according to their functions; 3) "polytonal chords" as distinguished from "polytonality," 4) analysis based on the principle that "the whole and its parts mutually determine each others' characteristics," 5) various ways of building chords, 6) intervals — stable and unstable, 7) "modulation" according to Messiaen's views, and 8) parallel chord motion, the tonality of which becomes post-functional. A final chapter deals with rhythm and form.

There may be disagreement with Roiha's explanations as well as with those offered by some of the writers he quotes. Nevertheless, the author is an able and practical expositor. His book, though short, offers much that is worthy of consideration to the intellectually mature musician interested in the technical aspects of contemporary music.

RICHARD DONOVAN

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ESSAYS ON MUSIC IN HONOR OF ARCHIBALD THOMPSON DAVISON BY HIS ASSOCIATES. [A sizable number of essays by music historians, theorists and performers on widely diverse topics.] Department of Music, Harvard University, Cambridge, Mass., 1957, pp. 374, $5.00.

Among the ESSAYS ON MUSIC may be found the following:

Haigh, Andrew C. MODAL HARMONY IN THE MUSIC OF PALESTRINA, pp. 111-20.

Hewitt, Helen. A STUDY IN PROPORTIONS, pp. 69-81.

La Rue, Jan. BIFOCAL TONALITY: AN EXPLANATION FOR AMBIGUOUS BAROQUE CADENCES, pp. 173-84.

Michkin, Henry G. IRRATIONAL DISSONANCE IN THE ENGLISH MADRIGAL, pp. 139-45.

Piston, Walter. THOUGHTS ON THE CHORDAL CONCEPT, pp. 273-78.

Franklin, Erik. TONALITY AS THE BASIS FOR THE STUDY OF MUSICAL TALENT. Gumperts Aktiebolag, Göteborg, Sweden, 1956,

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Pincherle, Marc. CORELLI: HIS LIFE, HIS WORK. Trans. from the French by Hubert E.M. Russell. W.W. Norton & Co., New York, N.Y., 1956, pp. 236, $4.00.

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Snyder, Alice M. CREATING MUSIC WITH CHILDREN. Mills Music, Inc., New York, N.Y., 1957, pp. 64, $2.50.

Tovey, Donald Francis. THE FORMS OF MUSIC. [Articles from the Encyclopedia Brittanica] Meridan Books, New York, N.Y., 1956, pp. 258, $1.35.

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Compiled by
Donald Loach

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LETTERS TO THE EDITOR

A Matter of Policy

Dear Sirs: April 20, 1957

I have been instructed by the Composers Section of the MENC California-Western Region to write you and inform you of a discussion which took place on April 17th at the Biennial Meeting in Pasadena.

The new Journal was applauded and the consensus was that you be requested to make the Journal an organ devoted to the interests of composers. Theory is, of course, a prime concern of composers and already your journal will be performing a great function. Expanded in coverage a bit, the value would be much greater. Since the disappearance of Modern Music a great hiatus has existed. It is earnestly requested that the proposal be seriously considered.

Several other groups have been contacted to find if they perhaps have a similar opinion....

John Vincent

Dear Sirs: May 7, 1957

I am particularly happy with the "Journal of Music Theory". In recent years my particular interests in music have been in theory and am glad that "we theorists" have at last an outlet for exchange of ideas. It is high time that theory as a specific investigation attain its deserving status. Your first issue is commendable; I only hope that the predominant "tone" of succeeding issues does not over-emphasize the historical aspects of theory. There are more than enough contemporary, controversial aspects of theory to at least give equal emphasis to.....

Arthur Edwards

CONGRATULATIONS!! Perhaps we shall have a real musicological journal at last. It may be of interest to you to be reminded that the American Library of Musicology set out, in 1932, to publish English translations of the great theoretical works, but folded up for lack of funds. All success to you.

Charles Seeger

Dear Mr. Kraehenbuehl: April 18, 1957

I have just received my copy of the JOURNAL OF MUSIC THEORY. May I take this opportunity to congratulate you and your staff for establishing a much needed scholarly journal in the field of music theory. Knowing much about the financial problems involved in publishing such a journal as you have in mind, I feel that Volume I, Number 1, is an achievement. I find it easy to read, exceptionally well edited, and the kind of superior scholarship so desperately needed in the field of theory...

Allen I. McHose

"Note" or "Tone"?

Dear Dr. Kraehenbuehl: April 4, 1957

...I am one of the people who are deeply distressed to find your country so determined to use German terminology for music, or at best musicologese, and I am fighting tooth and nail for English whenever I get an opportunity. (I have a special article on that hideous and nonsensical 'Voice-leading' in Grove, since Stimme in this sense is clearly not "voice" at all, but "part"—what about Violinstimme, Flotenstimme, and so on?) And I am really shocked by the prospect of an article on the "leading tone". "Tone" already has three or four other meanings in English, and this newfangled Germanic notion that the written thing is a note, but the heard thing a tone, just doesn't work in English — if English still matters, that is. The English classics are full of "notes". Are we now to change them to "native wood-tones wild", "Fain would I change that tone", etc. etc.? Of course I know what the answer invariably is: there is now an American language. I only wish there were one: what a pity the early settlers didn't take to Mohawk. I should be willing to learn it if your journal used it. Believe me,

Eric Blom

To the best of our knowledge, Mohawk was never given any consideration by our early countrymen. However, some real basis for our Germanic linguistic tendencies is evidenced by the fact that the German language was rejected in favor of the English language by a single vote in one of our original thirteen states. —Ed.

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